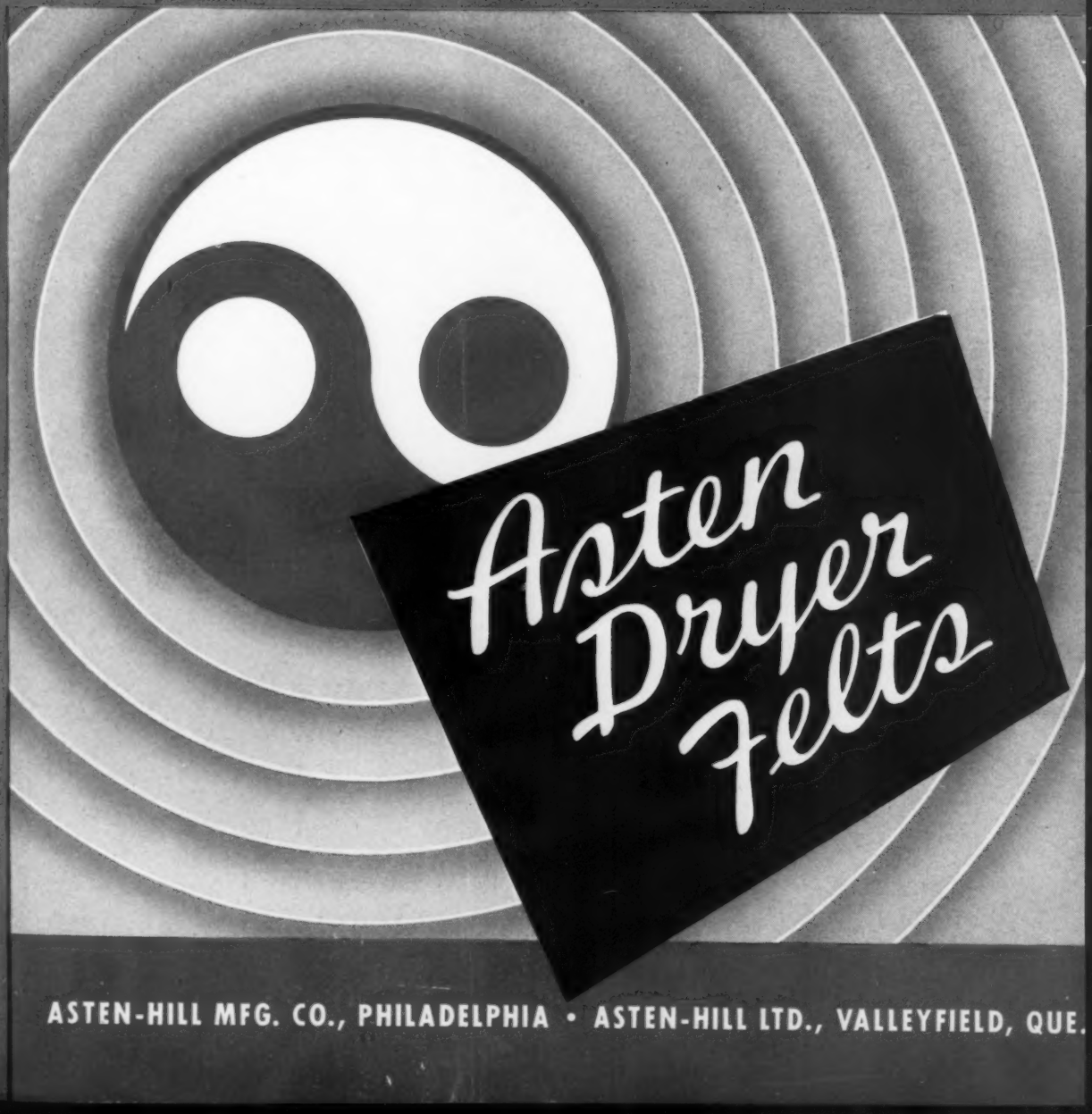
ENGINEERING
LIBRARY

DEC 15 1947

Paper TRADE JOURNAL

REG. U. S. PAT. OFF.

VOLUME 125, No. 24 DECEMBER 11, 1947

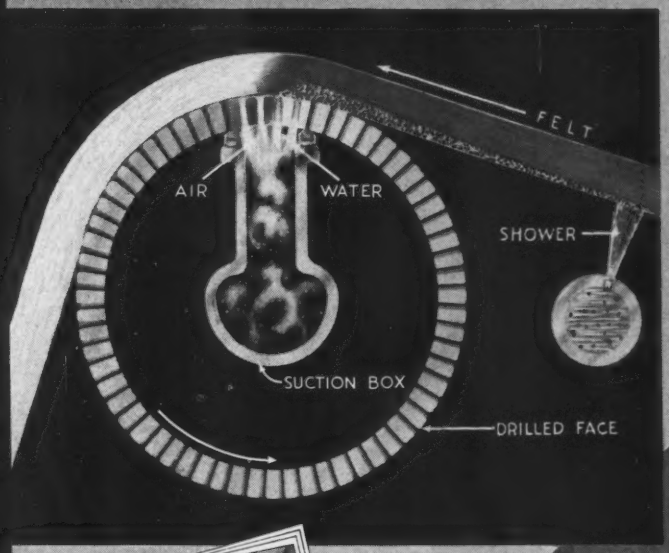


ASTEN-HILL MFG. CO., PHILADELPHIA • ASTEN-HILL LTD., VALLEYFIELD, QUE.

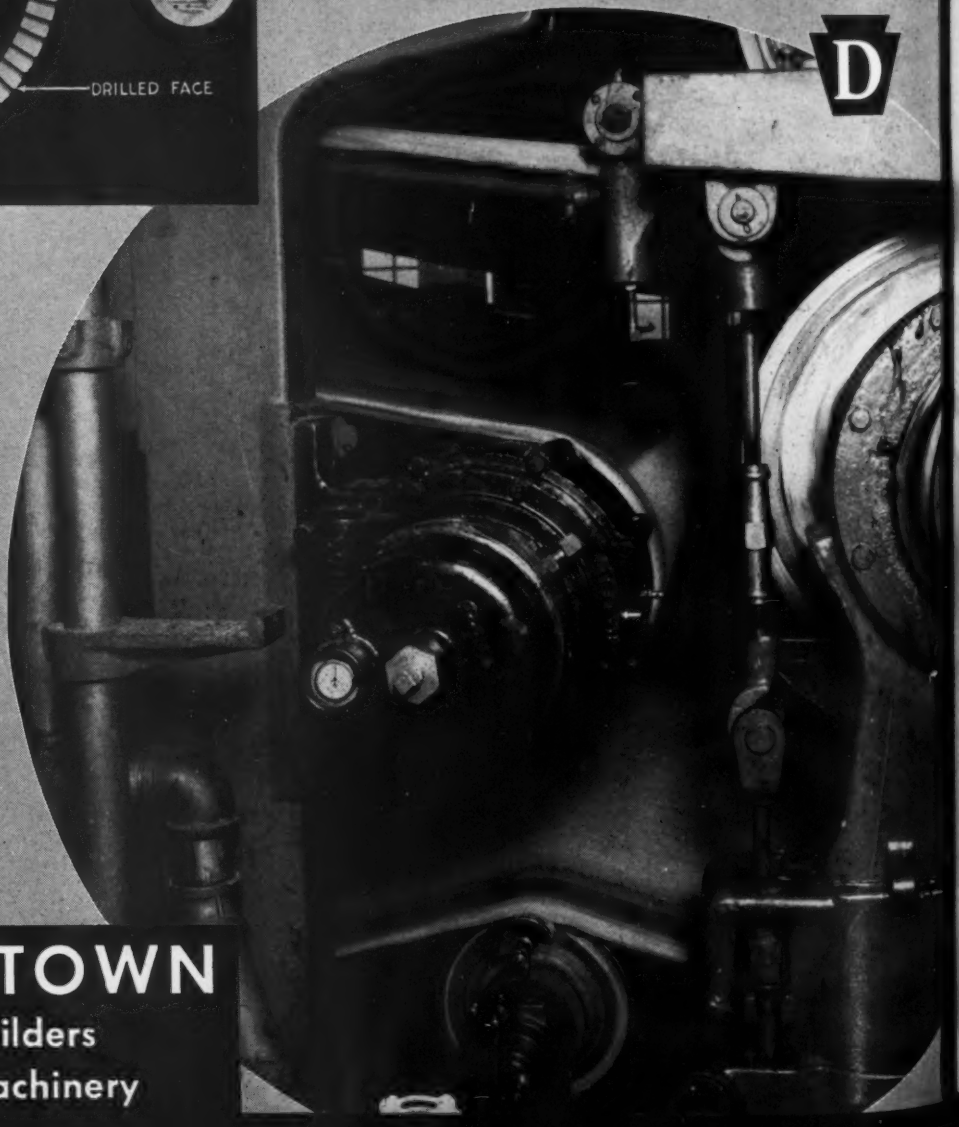
SEE THE "Straight Line" OF FELT CLEANING IN THE PHOTOGRAPH AT LOWER RIGHT

The sharp, distinct change of felt color from dark to light gray in the photo shows the cleaning and conditioning action of the Downingtown Suction Felt Roll. This is straight-across-the-felt-action which you have continuously and with safety. Sectional drawing shows how the roll is installed. It requires no drive; travel of the felt turns the roll, which is mounted in anti-friction bearings. Takes only about one-tenth the power consumed by drag of flat boxes. Over 200 now in use.

DOWNINGTOWN MFG. CO.
DOWNINGTOWN, PA.



New Catalog
Write for it today



Installation on a 214 inch fourdrinier making machine ➧ coated papers.

DOWNINGTOWN
Designers & Builders
Paper Making Machinery

Paper TRADE JOURNAL

VOLUME 125, NO. 24 REG. U.S. PAT. OFF. DECEMBER 11, 1947

River Power Seeks Building Permits

WISCONSIN RAPIDS, Wis.—The Wisconsin River Power Company last week filed an application at Washington with the Federal Power Commission for authority to build two hydroelectric developments on the Wisconsin river near Necedah, Wis.

Similar approval has been asked of the Wisconsin State Public Service Commission.

The Castle Rock project, 15 miles downstream on the river from the Petenwell dam on which work is now in progress, calls for construction of a dam with a 30-foot head, having a spillway section about 625 feet long, according to the federal commission's announcement at Washington, and a powerhouse section and an earth section about 2,000 feet long, and an earth dike 3 miles long, creating a reservoir of about 16,500 acres.

The powerhouse — contemplated location of which would be on the west bank of the Wisconsin, 7 miles from Mauston — is to contain five 4,300-horsepower turbines connected to five 3,000-kilowatt generators.

The Petenwell project is the larger

(Continued on page 38)

Abitibi, International, Lift Newsprint Price $6 a Ton

Alexander Heads NEPCO Foundation

PORT EDWARDS, Wis.—John E. Alexander, president and general manager of the Nekoosa-Edwards Paper Company, late last week disclosed establishment of Nepco Foundation, to be operated exclusively for religious, charitable, scientific and educational purposes for residents of Wisconsin.

In behalf of his company, Mr. Alexander presented the Foundation a check for $54,000 and the deed to a new eight-unit apartment building in Port Edwards valued at $90,000. The rental income from the apartment building will go to the Foundation, of which Mr. Alexander is president. Other officers are Walter A. Radke, Nekoosa, vice-president, and S. A. Casey, Port Edwards, secretary-treasurer. Directors are these officers and A. S. Puelicher, Milwaukee, and Frank McGarigle, Port Edwards.

Nepco Foundation became an operating charitable corporation late last week when John E. Alexander (right), president and general manager of Nekoosa-Edwards Paper Company, Port Edwards, Wis., presented Walter A. Radke (left), an officer of the Foundation, with a check for $54,000 and the deed to Nepco Court, a new $90,000 eight-apartment building in Port Edwards. Nepco Foundation is a charitable corporation organized and to be operated exclusively for religious, charitable, scientific or educational purposes for inhabitants of Wisconsin.

TORONTO, Ont.—Abitibi Sales Company, sales agency for Abitibi Pulp and Paper Company, Ltd., late last week declared a $6 per ton increase in the price of standard newsprint, effective January 1, 1948. This price boost brings the company's basic newsprint price in the United States to $96 a ton and in Canada to $92 a ton.

This action was followed later by International Paper Sales Company which notified its contract customers by telegraph of an increase of $6 a ton in newsprint for the first six months of 1948.

Consolidated Paper Sales, Ltd. announces that the company's contract price for standard newsprint will remain unchanged through the first two months of 1948. Arthur L. Dawe, vice-president and general manager of the company, said a substantial price advance subsequent to March 1, 1948, seems to be unavoidable because of continuing sharp advances in production costs. "Later action will depend upon what develops in this respect, particularly with regard to wage rates, increased cost of wood and other materials," he said.

Neither Price Brothers and Company, Ltd., nor Donnacona Paper Company, Ltd., Quebec, had any comment on the Abitibi announcement, according to reports here.

According to Hon. W. Earl Rowe, president of Great Lakes Paper Co., who has just returned from a trip to Great Britain and Scandinavian countries, the whole newsprint industry should plan for their productive facilities to be fully occupied during 1948 and for an indefinite period thereafter. Mr. Rowe hopes to give shareholders a fuller account of his findings later, but states that the world's demand for newsprint and wood pulp continues greatly in excess of any possibilities of supply; that the world's price is still substantially in excess of the price newsprint is being supplied under contract to the company's customers in the United States, and the demand for Canadian newsprint and wood pulp in the U. S. will continue. Mr. Rowe's trip overseas was to examine at first hand woods operations in the Scandinavian countries and to obtain in-

(Continued on page 38)

BRADFORD O. PREU

who has been named vice-president in charge of the B-F-D Division of the Diamond Match Company. Mr. Preu was vice-president and treasurer of the B-F-D Company before it was acquired by Diamond.

Howarth Paper Appoints Linderman Manager

PHILADELPHIA—William J. Linderman formerly salesmanager of Paper Merchants, Inc. has joined the J. R. Howarth Paper Company, Inc., as manager in its new five story building at 223-5-7 Arch Street where the company is planning an extensive program in the distribution of fine papers.

Previously associated with the Garrett-Buchanan Paper Company for over 20 years, where he specialized in fine papers. Mr. Linderman has been in the paper business for a quarter century.

Wallace Takes Post As Special Assistant

MILWAUKEE—William M. Wallace has been named special assistant to G. V. Woody, manager of the Allis-Chalmers basic industries department. A mechanical engineering graduate of Alabama Polytechnic Institute in 1937, Wallace joined the Allis-Chalmers graduate training course the same year. He served as a sales representative in the company's Denver and Pittsburgh district offices, and more recently as an engineer in the basic industries department.

Sporn Joins Milton Staff

NEW YORK—Milton Sporn has been appointed to the sales staff of the Milton Paper Company, Inc. by J. Milton, President of the Milton firm. Mr. Sporn, a graduate of the College of the City of New York, where he was active in several sports, has spent six years in various capacities at Milton in preparation for his promotion to the sales staff.

Diamond Promotes Preu and Kendall

NEW YORK — Election of two vice-presidents of the Diamond Match Company has been announced by Robert G. Fairburn, president.

They are: Victor R. Kendall of Chicago, vice-president in charge of sales of matches and allied products, and Bradford O. Preu, of New York, vice-president in charge of the B-F-D Division, acquired by Diamond earlier this year.

Mr. Kendall, who joined the company in 1931 as a retail match salesman, is widely known throughout the tobacco, grocery and drug trades. He was named general sales manager of the company in 1943. His home is in Evanston, Illinois.

Mr. Preu was vice-president and treasurer of the B-F-D Company, which he joined in 1927, until its merger with Diamond last spring. Since the formation of the B-F-D Division he has been its manager. The division manufactures paper, pulp, woodenware and safety matches. Mr. Preu's home is in Bronxville, N. Y.

Simultaneously Mr. Fairburn announced the appointment of Stillman Kuhns as comptroller of the company. Mr. Kuhns had been general auditor.

Harry Bennett Wins in Greenwich Election

NEW YORK—Harry Bennett, credit executive and assistant to Vice-President Charles Lander, of Reinhold-Gould, Inc., Manhattan paper distributors, has been elected Town Representative, in his home town, Greenwich, Conn. Mr. Bennett ran for office on an Independent ticket and won by a wide plurality.

A lifetime resident of Greenwich, Mr. Bennett joined Reinhold-Gould upon his separation from the U. S. Army Air Forces in which he served four years. He held the rank of Captain when discharged. Before the war, Mr. Bennett was a teacher in Greenwich High School. He attended Fresno State College, Trinity College and New York University School of Commerce, Graduate School of Education. Presently, Mr. Bennett is Connecticut State Director of the Junior Chamber of Commerce.

Appleton Paper Union Again Elects Casper

APPLETON, Wis.—William G. Casper reelected president of Paperworkers Local 16 of the Associated Unions of America, employes of the Appleton Coated Paper Company, at a meeting December 3. Lester Helser was re-elected vice-president; Stanley Zuleger, secretary; and Mrs. Edna Eggers, treasurer.

VICTOR R. KENDALL

named vice-president in charge of sales of matches and allied products for the Diamond Match Company. Mr. Kendall joined the company in 1931, became general sales manager in 1943.

Barksdale At Memphis For Bemis Sales

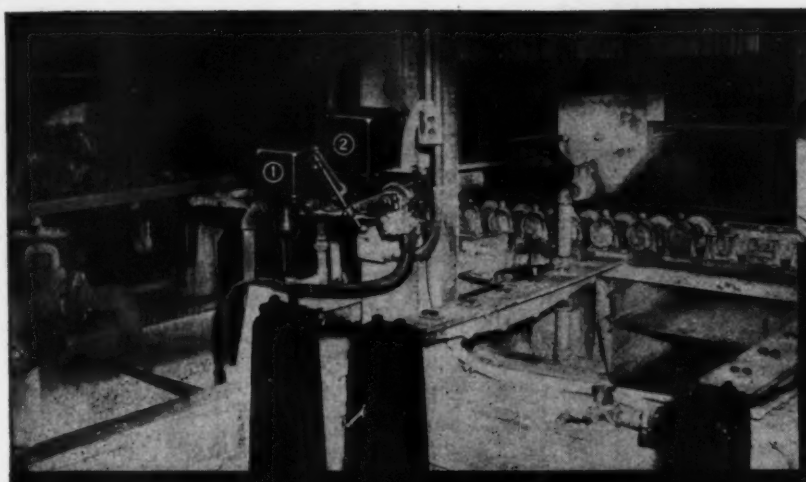
MEMPHIS, Tenn.—T. N. Barksdale, until recently in charge of Bemis Bro. Bag Company's Baltimore, Md., sales office, has assumed new sales responsibilities at the Bemis Memphis sales division. This office covers all of Tennessee and Mississippi and portions of five other states. Mr. Barksdale has been with Bemis for twenty-two years. Last May he was elected vice-president of the Norfolk Chapter Bemis Twenty-Year Club—a veteran company employe group which now has over a thousand members.

Worden Joins Container Lab.

CHICAGO — The Container Laboratories, Inc., has added to its rapidly growing sales staff Edwin S. Worden, Jr., as a research executive. During the war, Mr. Worden was responsible for subsistence and overseas resale parking specifications during his service with the Quartermaster General. He has had ten years experience as a consultant in his chosen field.

Bass Joins Johnassen

CHICAGO—W. M. Bass, a World War II veteran, has been named manager of the specialty sales division of the Johnassen Paper Company and will govern the sale of specialty items, paper products and allied lines. Offices of the company are at 82 West Washington Street.



PART OF MICROMAX PH CONTROL INSTALLATION AT KALAMAZOO VEGETABLE PARCHMENT CO. (1) IS ELECTRODE ASSEMBLY, (2) IS ALUM VALVE DRIVE UNIT.

MICROMAX PH CONTROLLERS FOR 3 MACHINES, MOSINEE PAPER MILLS

FROM PAPER OR BOARD MACHINE TO LAB— THERE'S AN L&N INSTRUMENT FOR pH

Whatever the pH problem may be—automatic control of stock fed to the Fourdrinier or cylinder, spot checks in the mill, control lab tests—there's an L&N instrument for practically any measuring need.

For Automatic Control

Automatic Micromax pH Control is now spreading rapidly. In some cases it helps to improve the uniformity, texture or color or finished sheet: in others it increases wire life and often saves alum.

Engineering-wise, Micromax pH Control offers the great advantage of being designed as a complete system, with components specifically intended for each other and for the responsive, dependable Micromax Controller. This instrument can be either a strip-chart model, with a long, detailed record and the feature of automatically standardizing its measuring circuit; or a round-chart model, with an unusually readable scale and a 24-hour circular chart.

For Manual Checks

The man who is not a pH expert finds the Glass Electrode pH Indicator easy to use and thoroughly dependable. The operator simply pours pulp, bleach, white water or other sample into a beaker, then reads pH on the Indicator's scale. Hot, damp atmosphere, up to 95% humidity at 85 F doesn't affect accuracy.

For high-precision testing by trained technicians, the Universal pH Indicator reads pH directly with its own glass electrode or any other electrode —has an accuracy of ±0.05 pH.

If you have a pH measuring, recording or controlling problem, we suggest you call in an L&N engineer. Or, if you prefer, we'll send any of the following publications:

Portable Glass-Electrode pH Indicator **EM9-96**
Micromax pH Recorders ..... **Cat. N-96(1)**
Paper Stock at Specified pH ..... **Bul. N-96-709D**

LEEDS & NORTHRUP COMPANY, 4967 STENTON AVE., PHILA. 44, PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

Jrl. Ad. N-96-709D(8)

USING PORTABLE INDICATOR FOR LAB TESTS AT W. C. HAMILTON & SONS

ONE OF SORG PAPER CO.'S AUTOMATIC MICROMAX PH CONTROL PANELS

Gottesman Presents $50,000 to Upsala

NEW YORK—D. S. Gottesman on behalf of the D. S. and R. H. Gottesman Foundation last week presented $50,000 to Upsala University in Sweden, honoring the fortieth anniversary of King Gustav V's ascension to the throne. The donation is to endow a series of lectures on the humanities by world renowned figures for a five-year period.

In a brief ceremony at the Royal Swedish Consulate, 61 East Sixty-fourth Street, Mr. Gottesman handed a check to Lennart Nylander, Swedish Consul General in New York. Also present was Gunnar Hagglof, former Swedish Ambassador to Russia and presently permanent delegate of Sweden to the United Nations.

"The gift is made in appreciation of the outstandingly brave, generous and humane help given by the Swedish people and their Government to the victims of Nazi persecution, of all faiths and nationalities, both during and since the war." Mr. Gottesman said, "The gift can be of real value if a better understanding of cultural, ethical and human values and human dignties emerges to counteract the destructive forces that have been released by the war, including the atom bomb."

Mr. Gottesman is president of Gottesman & Company, Inc. and Central National Corporation. The Gottesman Foundation is a non-sectarian philanthropic institution that began some years ago to make donations to various universities and welfare organizations. Among its contributions are those to Duke University, McGill University, and University of Maine.

Pennsalt Promotes Wilson To Head Safety Work

PHILADELPHIA — Vance N. Wilson has been appointed as safety coordinator for the Pennsylvania Salt Manufacturing Company by Frederick C. Abbott, manager of Personnel and Labor Relations. A graduate of the University of Michigan with a degree in economics, he joined Pennsalt in February, 1941. He enlisted in the Navy early in 1942 and saw service in both the Atlantic and Pacific areas, holding the rank of Lieutenant when separated from service early in 1946.

Upon his return to Pennsalt in June, 1946, Mr. Wilson was named supervisor in charge of tank care in the traffic department, according to an announcement by Jos. J. Duffy, Jr.

William Hennessy, has been appointed Pittsburgh district sales manager for the special chemicals division of the Pennsylvania Salt Manufacturing Company, according to an announcement by James J. Duffy, Jr., manager of sales.

A graduate chemist from St. Joseph's College, Mr. Hennessy joined Pennsalt in July, 1935.

Washington Will Salvage Maine's Burned Timber

WASHINGTON—Timber salvage has been launched by the Department of Agriculture in the fire-swept Maine experimental forests, it was declared last week. Operations are designed to salvage and estimated 8 million board feet of sawtimber and 6,000 cords of pulpwood remaining after the October fires in New England. All but 560 of the forest's 3,700 acres was burned over, the Department reported. This area was purchased by the Federal government under legislation adopted by the Maine legislature in 1937. It was intended as an experimental area for determining the best methods of forest management for eastern white pine, and related matters. Plans for the area had just been completed before the fire, it was learned.

Kalamazoo Makes Plans for Paper Makers Get-Together

KALAMAZOO, Mich. — The thirteenth annual "Paper Makers Get-together," sponsored jointly by the Michigan Division of the American Pulp and Paper Mill Superintendents Association, Inc., and the Kalamazoo Valley Section of TAPPI, will be held at the Park-American Hotel at 6:30, January 15, 1948. The speakers of the evening will be Dr. Lemoyne Snyder, physician-surgeon-lawyer-author-criminologist — at present medico-legal director, Michigan State Police, Lansing, Michigan. His subject will be "Why Should I Worry About Murder?"

Daniel T. Quirk, vice-president and general manager of the Peninsular Paper Company and mayor of Ypsilanti, will act as toastmaster.

National Container Buys Martin Brothers Plant

LONG ISLAND CITY, N. Y.—National Container Corporation, has purchased from the Martin Brothers Box Company its corrugated paper products converting plant located at Aurora, Ind. This unit which will serve the Cincinnati area and surrounding territory, will constitute the seventh in National Container Corporation's chain of converting plants scattered through the country, all of which are supplied with Kraft paperboard by the company's four Kraft mills. An eighth converting plant is in process of construction at Tomahawk, Wisconsin, adjacent to the mill in that city.

Kimberly-Clark Office Sets Christmas Dance

NEENAH, Wis.—The main office unit of the Kimberly-Clark Activities Association has selected December 22 as the date for its annual Christmas dinner dance in Germania hall, Menasha. The dinner will be served at 7 o'clock, and dancing will be from 9 to 1 o'clock.

Government Extends Alaskan Bid Date

WASHINGTON, D. C.—Time to qualify for bidding and the auction date for the sale of 1,500 million cubic feet of national forest timber in the vicinity of Ketchikan, Alaska, have been extended, according to the Forest Service of the United States Department of Agriculture. The postponement will permit parties who have already expressed a desire to bid to clarify their qualifications, as well as afford an opportunity for additional concerns to meet the bidding qualifications, Forest Service officials said.

Under the revised schedule parties who desire to qualify for bidding may submit statements to Lyle F. Watts, Chief of the Forest Service, on or before March 1, 1948. Applicants will be advised as to whether they qualify on or before March 29, 1948. The oral auction will be held in the chief forester's office, Washington, D. C., beginning at 2:00 p.m., April 14, 1948. All other terms and conditions of the proposed sale, which was originally announced on September 12, remain unchanged.

Six More Join Quarter Century Club

APPLETON, Wis. — Six employes of the Appleton Coated Paper Company were initiated into its Quarter Century Club at a dinner Wednesday evening, December 10, in the Crystal room of the Conway hotel in this city. Also guests were the 28 charter members of the club, which was formed last year, and their wives.

The new members are Richard W. Mahony, Max W. Eggert, Emil A. Kahler, Eva L. Mielke, Vilas J. Dorschner and George J. Regenfuss.

The welcoming address was given by Charles S. Boyd, who founded the company in 1907. Elmer Koerner was toastmaster and Matt D. Wyenberg and Cora Koletzke, club officers, inducted the new members. Fred C. Heinritz, president of the company, made a presentation to each new member.

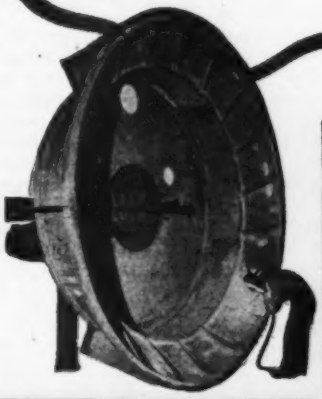
Seaboard Container Builds in Bristol

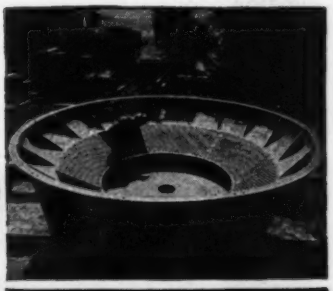
A $2 million plant for making corrugated paper boxes is under construction at Bristol for the Seaboard Container Company of Philadelphia. The company, officials said, plans to transfer many of its Philadelphia operations to Bristol.

The plant site is on State Road below Bristol near the Delaware River and construction by McCloskey & Company, Philadelphia, is starting. A one-story, brick and steel structure with a floor area of more than 150,000 square feet will be erected.

How the new DILTS Hydrapulper SAVES YOU MONEY 4 WAYS

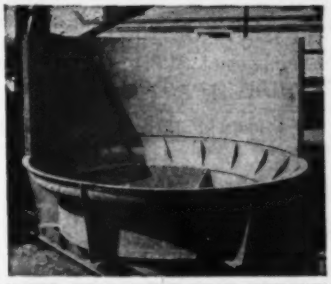
1 Cuts assembly time
2 Resists corrosion and wear
3 Protects paper stock
4 Boosts output





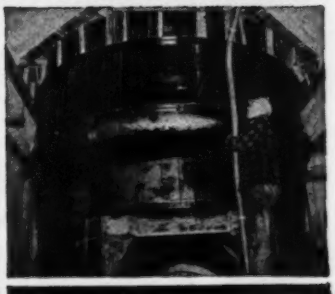
1 WELDING STATIONARY VANES of pure Nickel to the dished bottom of the Nickel-Clad Steel hydrapulper.

2 INSTALLING EXTRACTOR PLATES on the completed bottom. This section is now almost ready for shipment.



3 SIDE PLATES of rolled Nickel-Clad Steel are made in two sections. They are joined to each other and to the bottom plate by welding on the job.

4 INSPECTING THE WELDS. Permanently leakproof, the welded seams eliminate caulking, help reduce vibration, provide more rigid construction.



5 LOOKING INTO the completed *Dilts Hydrapulper* from upper level. The rotor, made of 3% nickel cast iron for resistance to wear and abrasion, reduces furnish to slush at 195 rpm.

6 EXTERIOR VIEW from lower level. This all-welded unit of Lukens Nickel-Clad Steel was designed jointly by *Smith & Caffrey Co., Syracuse, and Dilts Machine Works, Fulton, N. Y., a division of Black-Clawson Co., Inc., Hamilton, O.*

FOUR WAYS, did we say? Better change that to *five.*

For this hydrapulper is constructed almost entirely of Lukens Nickel-Clad Steel.

And that means another saving. Lukens Nickel-Clad Steel not only protects your paper stock from rust stains and other damage, *it brings you all the strength and corrosion-resisting qualities of pure Nickel at a much lower price than you'd pay for the solid metal.*

Credit the SMITH & CAFFREY COMPANY, Syracuse, and the DILTS MACHINE WORKS, Fulton, N. Y., for this simple and efficient hydrapulper design. It permits building and shipping the unit in four sections. It saves construction cost and time. It saves shipping time and space and weight. And it makes final assembly an easier, quicker job!

The twelve-foot-diameter hydrapulper you see pictured here is now in service at the National Paper Corporation plant in Ransom, Pa. They use it mostly for processing facial and toilet tissues.

At National, the basic furnish is a combination of virgin pulps and reclaimed paper. It is quickly broken down to flowable form by the rotor which turns at 195 rpm. Each batch is thoroughly defibered and blended in a matter of seconds.

In the pulp and paper industry, Lukens Nickel-Clad Steel is widely—and wisely—used wherever rust and corrosion threaten quality production or endanger equipment life. You'll find a lot of helpful information about this economical construction material in the illustrated booklet, *Lukens Clad Steels.* Write us for your free copy.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
NICKEL INCO ALLOYS

MONEL* • "K"* MONEL • "S"* MONEL • "R"* MONEL • "KR"* MONEL
INCONEL* • NICKEL • "L"* NICKEL • "Z"* NICKEL *Reg. U.S. Pat. Off.

FINANCE

St. Lawrence Drafts New Finance Plan

MONTREAL—Plans of reorganization for the St. Lawrence Corporation, Ltd., and the St. Lawrence Paper Mills Company, Ltd., Canadian concerns, have been drafted by directors of the companies and a special committee of stockholders. The plans will be submitted to the shareholders at special meetings in Montreal on December 22 and 23.

The plans provide that two new classes of preferred stock shall be created for both companies to eliminate dividend arrearages on the preferred stocks. Back dividends of $8,085,656, or $64.75 a share, have accumulated over a seventeen-year period on the 6 percent cumulative preferred stock of St. Lawrence Paper Mills, while arrearages of $5,552,421, or $21 a share, have been built up on the Class A cumulative convertible issue of the St. Lawrence Corporation.

The plan for the Paper Mills Company provides that, in place of each present 6 per cent $100-par preferred share, there shall be issued: one new first redeemable preferred share, $99 par value, carrying a $6 annual dividend, together with one new second cumulative preferred share, $1 par with an annual dividend of $2. The company's common stock will remain unchanged.

The plan of reorganization for the St. Lawrence Corporation provides that each share of Class A stock will receive one share of first cumulative convertible redeemable preferred stock, carrying a $2 dividend, and one share of second cumulative convertible redeemable preferred stock, with a dividend of 50 cents annually.

The St. Lawrence Corporation, the parent company, said that it is contemplated that regular preferred dividends would be initiated promptly on all classes of preferred stock by both companies and added that confirmation of the plan would pave the way for disbursements on the common stocks of the company and its subsidiaries.

Puget Sound Votes Extra on Common Stock

BELLINGHAM, Wash.—Directors of Puget Sound Pulp & Timber Co. have declared the regular quarterly dividend of 30 cents a share on the preferred stock, payable January 1, 1948, to stock of record December 23, 1947, and the regular dividend of 50 cents plus an extra 50 cents a share on the common stock, payable December 29, 1947, to stockholders of record December 11, 1947.

The preferred dividend is the last to be paid on this stock as all shares of preferred outstanding as January 1st, 1948 have been called for redemption at the call price of $24 a share. The preferred stock is convertible into common at the rate of one and one-ninth shares of common for each share of preferred. This conversion privilege expires December 22, 1947, on any shares not delivered to the transfer agent, San Francisco Main Office of Bank of America on or before that date.

Crown Zellerbach Net Rises for Six Months

SAN FRANCISCO—The Crown Zellerbach Corporation and its subsidiaries reported last week for the six months ended on October 31 a net income of $9,567,899 after $6,085,096 provision for taxes. The income was equal to $3.40 a share of common stock.

For the corresponding period of last year the net income, after $4,040,477 taxes, was $5,740,625, or $1.89 a common share. Sales for the period this year increased to $74,211,648 from $59,457,830 in 1946.

Production of mills amounted to 358,488 tons, an increase of about 6 percent over the similar period last year. Expenditures for plant additions, improvements and replacements aggregated $10,000,000. These expenditures have been financed partly from funds obtained from undistributed earnings and from depreciation and depletion provisions and partly by borrowing a second $6,000,000 under the company's $20,000,000 bank credit.

Celanese Directors Vote Dividends

Directors of Celanese Corporation of America this week declared a dividend of 40 cents per share on the common stock, payable December 31, to stockholders of record at the close of business December 16. At the same time the board also voted regular quarterly dividends for the current quarter of $1.18¾ on the first preferred stock, $4.75 series, and $1.75 per share on the 7 percent second preferred stock. Both these dividends are payable January 1, to stockholders of record at the close of business December 16.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending December 6, 1947

STOCKS

	High	Low	Last
A. P. W.	4⅞	4⅞	4⅞
Armstrong Cork Co.	49⅝	46½	47
Armstrong Cork Co., pf.	97	95	95
Celotex Corp.	27	25⅞	25⅞
Celotex Corp., pf.	20⅛	20⅛	20⅛
Certain-Teed Products Corp.	17¼	16¼	16⅜
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	22	21⅝	21¾
Champion Paper & Fibre Co., pf.	103¾	103⅜	103¾
Congoleum Nairn Co.	32¼	31	31
Container Corp. of America	41⅞	39⅝	39⅞
Container Corp. of America, pf.	....	....	....
Crown Zellerbach Co.	32⅞	31¾	32
Crown Zellerbach Co., pf. 4.20	103	101	101½
Crown Zellerbach Co., 4 pf. 4	122⅝	120	120¾
Dixie Cup Co.	34½	34	34
Dixie Cup Co., A	55¼	54	54
Flintkote Co.	34¾	33⅜	33¾
Flintkote Co., pf.	100¼	100¼	100¼
Robert Gair	9⅛	8⅜	8½
Robert Gair, pf.	19½	19	19½
International Paper Co.	56	51¾	52
International Paper Co., pf.	94½	94½	94½
Johns-Manville Corp.	42	39	39½
Johns-Manville Corp., pf.	113	109¼	109¼
Kimberly-Clark Corp.	24½	23¼	23¾
Kimberly-Clark Corp., pf.	105¼	104½	104½
Mac Andrews & Forbes	38¾	38	38
Mac Andrews & Forbes, pf.	135	135	135
Marathon Corp.	21¾	20½	20½
Mead Corp.	20⅞	19⅝	19⅝
Mead Corp., pf. 4¼	94	93	94
Mead Corp., pf. 2	45⅜	43	43
National Container Corp.	14	13¼	13⅜
Paraffine Companies, Inc.	77	75	75
Paraffine Companies, Inc., pf.	103	101	101
Rayonier, Inc.	30⅝	29	29⅝
Rayonier, Inc., pf.	36½	35⅝	35⅝
Ruberoid Co.	63	60⅜	60⅜
St. Regis Paper Co.	10	9½	9⅝
St. Regis Paper Co., pf.	90⅜	89½	89½
Scott Paper Co.	43	40¾	42¾
Scott Paper Co., pf.	96⅜	96	96
Sutherland Paper Co.	40¾	39	39
Union Bag & Paper Corp.	31½	28⅝	29⅜
United Paperboard Co.	15⅞	14⅞	1[illegible]
United Wallpaper	6⅛	5½	5⅜
United Wallpaper, pf.	35	35	35
U. S. Gypsum Co.	105	100	100
U. S. Gypsum Co., pf.	180	178	180
West Virginia Pulp & Paper Co.	44½	43	43
West Virginia Pulp & Paper Co., pf.	106	106	106

New York Curb Exchange

High, Low and Last for Week Ending December 6, 1947

STOCKS

	High	Low	Last
Great Northern Paper Co.	45½	45	45
Taggart Corp.	10½	10½	10½

BONDS

American Writing Paper Co., 6s '61	....	....	....

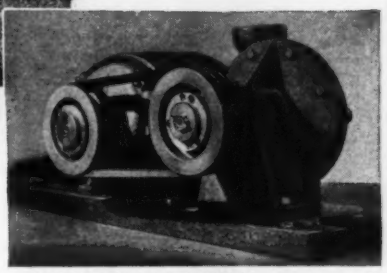
BUY THIS NEW PUMP

"Off-the-Shelf"

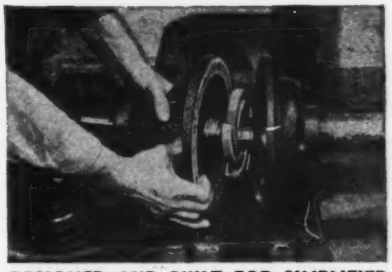
IT HAS MANY APPLICATIONS

3 Stock Sizes Give Wide Range of Capacities

THE NEW "Pedrifugal"* Pedestal Type CENTRIFUGAL PUMP



BUY IT "OFF THE SHELF" — Pump can be bought "bare" or as a complete unit pump motor, Texrope drive and welded steel base Also can be coupled or belted to a motor, a gasoline engine or power take-off which you already have.



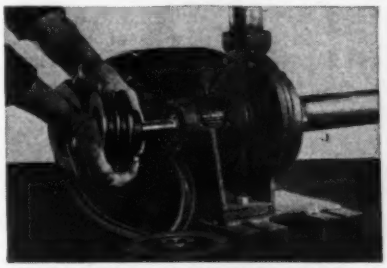
DESIGNED AND BUILT FOR SIMPLIFIED MAINTENANCE — All moving parts quickly accessible without disconnecting pipes. No packing rings to replace . . . bearings have 3 to 5 year supply of grease under normal operating conditions.

THROUGH SIMPLE CHANGES in V-belt drive, impeller or casing these new pumps meet all average pumping requirements up to 500 gpm and heads to 100 ft.

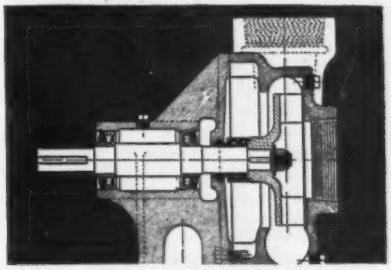
They were designed for the average user, who does not need a pump of special design or specification, but who does want a thoroughly reliable pump at a reasonable price, that he can buy right out of stock, and adapt to his needs.

The new "Pedrifugal" pump is built up to highest Allis-Chalmers standards in design, materials and workmanship. It is thoroughly tested, and backed by 65 years of engineering leadership in the design and construction of fine centrifugal pumps. Find out more about this new pump at your nearest A-C office or dealer. For specifications, ask for Bulletin 52B6691. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 2306



V-BELT DRIVE GIVES GREAT RANGE OF CAPACITY — The Pedrifugal pump is specially designed for flexible TEXROPE V-belt drive Changing one sheave quickly changes speed and capacity of the pump . . . gives you great flexibility.



HIGH GRADE CONSTRUCTION — Two large ball bearings, grease sealed . . . High grade mechanical shaft seal . . . Heavy 1 in. machined shaft with *key ways* and impeller lock nut . . . Bronze open type impeller . . . Heavy, generous design throughout.

*Allis-Chalmers Trademark

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

NEPCO Tops $2 Million For Nine Months

PORT EDWARDS, Wis.—A twenty-five cent fourth quarterly and fifty cent special dividend was voted by the board of directors of Nekoosa-Edwards Paper Company, at its last regular meeting. The quarterly and special dividends are payable December 31 to stockholders of record December 20, and will bring the total dividend payments for 1947 to $1.75 per share.

While final figures for the year are of course not available now, the board announced that the first nine months net income was $2,123,775, or $6.75 per share on 315,000 common shares, against $707,712, or $2.25 a share for the first nine months of 1946.

In announcing the favorable report for the first three quarters of 1947, the board of directors called attention to the fact that the expansion program calls for large capital expenditures, during both 1947 and 1948, aimed at insuring improved product quality and operation efficiency in the future.

The Nekoosa-Edwards Paper Company is concluding one of the most active years in its entire history, its 60th anniversary year. Far-reaching advancements have been put into effect during 1947 in the company's program of maintaining a leadership position in America's papermaking industry. Among these changes are new equipment placed in operation, improvements in manufacturing and technological procedure and important personnel changes. During January three vice-presidencies were established in order to provide more effective control over the increasingly important operations of administration, manufacturing and sales. Appointed to the vice-presidencies were N. E. Nash, vice-president; Charles H. Reese, vice-president in charge of manufacturing; and Adam C. Remley, vice-president in charge of sales. Other important January activities included company gifts of $42,000 to the Alexander Natatorium Fund and $500 to each of five churches in the two communities, Port Edwards and Nekoosa.

February of 1947 marked the anniversary date of Nekoosa-Edwards completion of 60 years of paper progress. The anniversary theme was carried out in the 1947 NEPCO calendar, a profusely illustrated anniversary book telling the life story of Nekoosa-Edwards and the American paper industry, and all company advertising and publications released during the year. During February the village of Port Edwards received a gift of $35,000 from Nekoosa-Edwards, funds to be used for village beautification.

Highlights of March were the appointments of N. H. Christian and R. A. Nugent to the position of manufacturing superintendent, the organization of the NEPCO Camera Club and the completion of 21 years without a lost time accident by the NEPCO Lake hydro-electric plant operators. Christian's and Nugent's appointments were made to effect closer contact between all departments of each mill and to ease the burden carried by company supervisors due to the unsettled conditions which have existed over the past several years.

During the months of April through August 174 NEPCO "Old Timers" who have been with the company for over 25 years were feted for their splendid records of long-time and loyal service. Their total employment records exceed 5,000 man-years of service. Evaporator changes at the Nekoosa pulp mill were inaugurated during May to provide for more economical recovery of chemicals and waste heat. Promotions in June included R. C. Crain and Art Sarver to superintendencies at the Nekoosa paper mill and Bob Gilbert to a foremanship in the Port Edwards sulphite mill. A new "Y" type Worthington compound air compressor was installed in the Port Edwards mill, also in June.

July and August

The summer months of July and August saw the renewal of boys' and girls' club activities in Port Edwards and Nekoosa. These efforts, aided by company sponsorship, have contributed greatly to the prevention of juvenile delinquency in the two NEPCO communities by providing ample work and play opportunities for the children. The month of August also found the completion of the Port Edwards mill office addition and modernization, the advancement of Dr. Herbert W. Rowe to research director, and the re-election of company officers and directors.

Completion of the modern new yard office at Nekoosa was the outstanding project during September. Construction was also begun on a new roof over number 5 and 6 machines at Port Edwards. Approximately 3,800 people, including NEPCO employees and members of their families, turned out for the celebration of the 60th year of Paper Progress, August 24. The extension of cash grants by Nekoosa-Edwards to employees who intend to build homes was announced during August.

Two of the most important projects in the post-war expansion and improvement program were realized during the concluding months of the year. The new Nekoosa filter plant and the new Nekoosa bleachery are the projects referred to. Both of these projects incorporate the latest advancements in technological design.

Garden City Envelope Builds New Plant

CHICAGO — The Garden City Envelope Company is building a new plant 150 x 630 feet on the corner of Rockwell and Wellington Streets. The new structure which will cost around $275,000, will be utilized by the company as a converting plant to aid in matching the growth of the concern.

See Paper Output Up In United Kingdom

WASHINGTON—The estimate of paper and paperboard production in 1948 in the United Kingdom has been set at roughly ten percent above 1946 levels, the Department of Commerce reports, based on information from Embassy sources in London quoting trade and industry. A 20-percent increase in newsprint is called for.

These rates of increase, it was stated however, have been chosen merely to indicate the government's and industry's desire to increase production. In the case of newsprint, it was said, the anticipation of a 20-percent increase is based on the consideration that this particular item may receive relatively better treatment, as to coal and other facilities made available, than other papers. For some years it has been produced at levels lower than for other papers, it is pointed out.

Based on information from trade and industry, as well as other sources in the United Kingdom, the survey continued:

"Normally the pulp and paper industry in the United Kingdom is based on large imports of chemical and mechanical wood pulp, aggregating about 1,800,000 short tons annually in prewar years. Imports of chemical wood pulp amounted to about 70 percent of the total with Finland, Sweden, Norway, Canada, and several other countries as the chief sources of supply. During the war, imports of chemical and mechanical woodpulp were only 20 percent of the prewar figures, since Northern European countries were unable to continue exports. Canada, Newfoundland and the United States supplied the greater portion of these pulps.

"In 1946, production and export of both paper and board increased, and although increases were registered in the majority of imports, total imports decreased. The basic factor in the paper and board situation was the shortage of wood pulp which prevented production from rising to relatively high levels.

"Only three mills possess grinding facilities for direct processing of pulpwood into mechanical wood pulp. Prior to the war, these mills received the bulk of their supplies from Russia, Newfoundland and Canada. During the war, they used domestic hardwoods and softwoods of inferior quality, blending the resulting pulp with small amounts of imported mechanical pulp and waste paper. They are operating on a similar basis today.

"A few pulp and paper plants suffered from direct war damage, but this was not so extensive as to seriously impair the full-productive capacity of the industry. When full output is again possible, it is expected that repairs and replacements of buildings

(Continued on page 30)

Lukenweld Jacketed Drier Rolls

(Patents applied for)

"On the job" performance by Lukenweld *Jacketed* Drier Rolls in a wide range of industries proves their ability for faster, more efficient drying. Numerous installations show drying rate stepped up 15 to 25 per cent with no increase in steam pressure. When steam pressures were increased, drying rates were stepped up as much as 50 per cent. *That means increased output* to answer demands for greater production.

The double-shell design and welded steel plate construction of Lukenweld Jacketed Drier Rolls give these advantages: *Greater steam velocity* . . . steam is guided into the restricted area between inner and outer shell, resulting in *vastly improved heat transfer* properties. *Quick, positive condensate removal* . . . removal pipe revolves with the roll, taking out a definite amount of condensate and entrapped air with every revolution. High strength of rolled steel plate permits *safe operation at pressure of 350 psi and higher* . . . provides high dimensional stability.

Get the complete story about Lukenweld Jacketed Drier Rolls. Write for Bulletin 358. Lukenweld, Division of Lukens Steel Company, 403 Lukens Building, Coatesville, Pa.

Sizes from 2 feet to 18 feet O. D. and over

LUKENS
LUKENWELD DIVISION

LUKENWELD

DRIER ROLLS AND DRYING MACHINERY

Gottesman Fund Gives Grant to Maine Univ.

ORONO, Me.—The University of Maine will receive an annual grant of $1,000 from the Gottesman Folndation to be used for the encouragement and promotion of scientific and industrial research in the pulp and paper field. Dr. Arthur A. Hauck, president of the university, declared last week. The expenditure of funds from this grant for scholarships, fellowships, and for the promotion of research is to be administered by the president of the university, the director of the Department of Industrial Cooperation, and a representative of the Eastern Corporation of Brewer, Maine.

The first fellowship under the Gottesman Foundation at the university has been awarded Hsiang-chu Chun, a candidate for the M.S. degree in chemical engineering. The title of his research work is "An Investigation of the Relationship between Evaporation and Spray Drying of Sulfite Waste Liquor."

Another industrial fellowship that is being continued at the University of Maine is the Eastwood-Nealley Fellowship, established in 1944 by the Eastwood - Nealley Corporation, of Belleville, N. J. Funds provided by this grant are used for the encouragement of scientific and industrial research and are determined by mutual agreement between the company and the university.

At the present time the Eastwood-Nealley Fellowship is being prosecuted by Henry Fogler, of Hastings-on-Hudson, N. Y., and Fred Herbolzheimer, of Wakefield, Mass., who are candidates for the M.S. degree in chemical engineering. The title of their research work is "An Investigation of the Spray Drying of Sulfite Waste Liquor."

Investigations under both fellowship grants are being administered by Professor Lyle G. Jennes, acting head of the department of chemical engineering and the department of industrial cooperation at the university.

Rayonier Raises $20 Million To Retire Loans, Buy Land

NEW YORK—Rayonier Incorporated, largest producer of wood cellulose used in the manufacture of rayon, cellophane, and other cellulose derivatives, has completed private financing in the amount of $20 million through the Metropolitan Life Insurance Company and a group of banks. The loans are to be amortized over a period of fifteen years.

Part of the proceeds are to retire existing loans, according to President Edward Bartsch, and the balance is being used in payment of the recently announced acquisition of a controlling interest in the Polson Logging Company. This acquisition gives the company extensive timberlands and logging facilities on the Olympic Peninsula, State of Washington, and assures operation of the company's three Northwest mills for many years to come.

Mr. Bartsch states that the financing of the acquisition is taken care of entirely through these long-term loans.

New Logging Records Set In British Columbia

VANCOUVER, B. C.—Existing records for production by the forest industry in British Columbia are all being beaten this year. Last year production was valued at $173,471,320. This year it is already known that production value will exceed the $200 million mark. These estimates are based on progress reports to the Forest Service Branch on the cutting so far.

Logging in the big Vancouver district, which takes in the lower coast forest area, has been at such an unprecedented rate that the Forest Service scalers are two months behind in compiling their reports. The service has not enough staff to keep pace.

Latest accurate figures, just compiled, show a saw log scale up to the end of July that is nearly 50 percent ahead of last year.

The scale total for seven months' saw logs is 2,212,607,424 board feet. Last year at corresponding date it was 1,508,873,039 board feet.

In addition, there is a lineal foot scale of poles and piling amounting to 25,589,671 feet, 82,994 cords of wood and 280,104 hewn ties.

Schrier Joins Downingtown

DOWNINGTOWN, Pa.—The Downingtown Manufacturing Company has appointed Frank F. Schrier to its engineering staff. Mr. Schrier brings to his new connection 37 years' experience in the design, manufacture and operation of paper mill machinery.

FRANK F. SCHRIER

Chemical Exposition Lists Paper Names

NEW YORK — More than four hundred exhibitors displayed their wares last week at the 31st annual Exposition of Chemical Industries in this city. Though the show was designed for an appeal to all industry the deep interest of the paper industry in chemicals was reflected by the presence of corporation names well known to paper men. The paper industry also was well represented among exhibitors through the showing of bags by Bemis Bro., St. Regis and Union Bag and Paper.

Hercules Powder Company had an extensive display illustrating the products they make for various industries, including those which are especially applicable to the paper industry, such as rosin and rosin size, casein, carboxymethylcellulose, satin white, lacquers, foam killers and plasticizers.

Ingersoll - Rand Company exhibited pumps and distillation equipment.

International Nickel Company showed the use of nickel in various types of equipment where resistance to corrosion of strong alkali is important.

John-Manville had an interesting exhibit showing the various steps in transforming asbestos mineral into a variety of extremely useful products.

Lukens Steel Company displayed its "clad" steel which allows the use of a fairly thin surface of stainless steel nickel, monel, etc., backed up by a tightly bonded backing of steel. This gives protection against corrosion and contamination and also provides good strength at low cost. Lukenweld, Inc., a division of Lukens Company, exhibited welded products.

The Nash Engineering Company had an excellent display explaining the operation of liquid rotor pumps which are used as gas compressors but which also have such a wide usage in the paper industry as vacuum pumps.

The National Technical Laboratories displayed a complete new line of Beckman PH electrometers including portable instruments that operate from a line current and control and recording of PH valves.

Allis-Chalmers had a varied display of pumps, compressors, blowers, pulverizers, motors and drives all of which are applicable to almost all industries including pulp and paper.

Cambridge Instrument Company displayed some of its instruments and panel boards which are being used so widely in all industry to provide automatic control and recording of various processes.

Blaw-Knox Company had a display of models showing various types of intricate processing equipment which they fabricate.

The Bird Machine Company showed various types of filters and centrifugals.

The Dicalite Company had an exhibit which told the story of the for-

(Continued on page 34)

IF YOU'RE SEEKING SAVINGS

in *CONSTRUCTION* and *MAINTENANCE*

here's the place to look!

If rocketing construction costs have brought you budget problems, let Koppers pressure-treated wood solve them. In applications from foundations to roof decks, it brings *present savings* in building costs—*future savings* through long, trouble-free life and low maintenance.

PERMANENT FOUNDATION WORK. Koppers pressure-creosoted piles provide high load-bearing capacity at low cost. Preservative treatment permits cut-offs to be safely made above water table.

ROT-RESISTING FLOORS. A wood floor or sub-structure on or near the ground faces a decay threat. Koppers pressure-treated wood gives dependable protection against this hazard.

INDURING PLATFORMS, WALKS, STEPS, and OVERPASSES. Koppers pressure-creosoted wood protects against decay, which is the primary cause of much wear and mechanical failure. It makes outside structures serve longer.

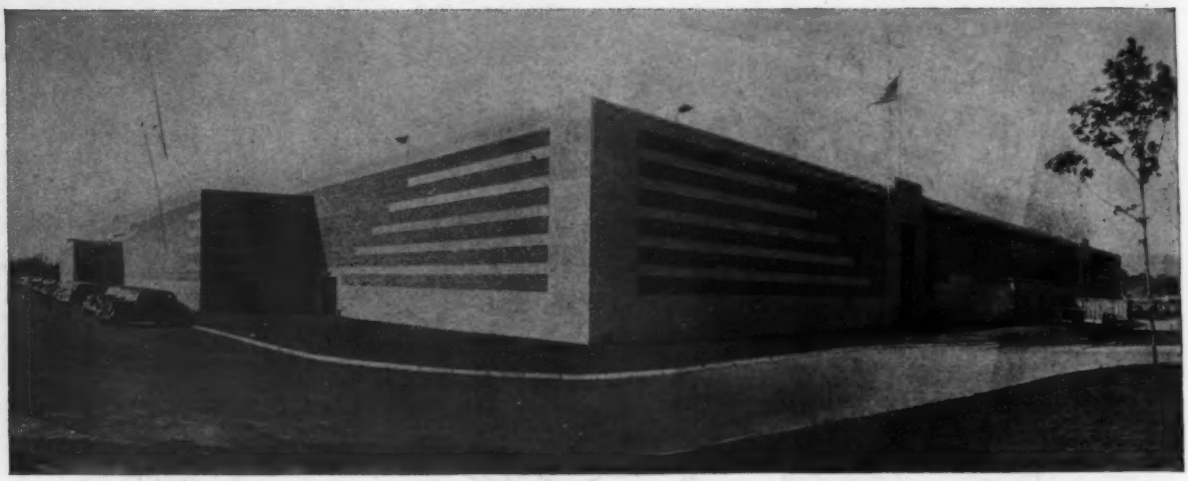
FIRE-RETARDANT FRAMING. Koppers fire-retardant treatment, applied to vulnerable building members, gives a high degree of protection against fire, dependable resistance to decay and insect attack as well.

DECAY-DEFYING ROOFS. Wherever humid atmospheres create a decay hazard, Koppers pressure-treated wood provides essential protection for long dependable service.

K KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.
PITTSBURGH 19, PENNSYLVANIA



As well planned inside as it is streamlined outside, the new Simonds Saw plant is designed for maximum efficiency—and looks the part

Simonds Saw and Steel Opens Little Red Schoolhouse Doors

FITCHBURG, Mass. — Its new five-acre windowless, controlled conditions plant, and a new visual method of schooling its sales representatives were set before a selected group of visitors last Friday by the Simonds Saw and Steel Company. The guests of the day saw a modern streamlined plant with its manufacturing operations all on one floor. The focal point of their interest was the Simonds Little Red Schoolhouse, in which a specially devised set of exhibits is arranged so that the verbal message is demonstrated practically, if on a somewhat reduced scale.

At his left as he enters, the visitor finds two woodsmen, twelve inches tall, using a Cross-cut Saw to fall a tree. These are augmented by many model machines, built to demonstrate how each Simonds Product is used, yet not detailed to the point of being complicated and fussy. Mounted on the backboards of each cabinet are actual, full-sized products of the type used on the machines reproduced in miniature before them.

Returning to the forest scene, you see next "huge" logs being snaked out by a logging arch and towed by a big "cat." Details of realistic exhaust grime on the tractor top, tracks in the soft earth, and an oil painting of the forest in the background, lend atmosphere to make the scene complete.

Following comes the log pond, where logs, brought from the woods by trucks, are cut to length by a pond drag saw. The log chute from the pond leads to the mill entrance, and the head band saw rig, where the process of sawing logs to boards is begun. Behind the band mill are the edger, trimmer, and slasher saw operations. Below there is the hog, which chops all refuse into chips for boiler fuel.

A veneer plant, with its lathe and clipper, is followed by a pulp and paper plant. The "large" chipper machine is surrounded by other machines used by the paper industry.

Log piles at the veneer lathe and chipper, lumber piles in the planing mill, and a steel rack containing many sizes and shapes of steel found in the machine shop, are also included and effectively show the type of raw material each plant uses.

In the metal-working shop, which immediately follows, Simonds diversified line of metal-cutting tools is shown on models of standard machines designed for specific cutting operations.

A circular saw for cold cutting steel bars or shapes is here found on a typical machine. Solid tooth, inserted tooth, or segmental type saws all operate on a machine of this kind.

Sliding panels, which operate in a special alcove at one end of the room, are another noteworthy feature of the Schoolhouse. One of these is used as a screen for showing movies. Other panels serve as background for a review of the company's broad advertising program. Included are reprints of advertisements currently appearing in the leading general industrial and most widely read trade publications covering existing and potential markets for the company's many products; samples of the latest direct mail pieces, instruction booklets, descriptive folders, and special sales campaigns designed exclusively for Distributors' use.

Other phases of company advertising, such as movies, catalogs, trade show exhibits, and sales training courses, are also covered. This review impressively demonstrates how extensively Simonds uses advertising to pave the way for sales.

The Simonds Company feels that all salesmen, their own as well as those of their distributors, after a visit through the manufacturing line and a Schoolhouse training course, will leave Fitchburg better informed, qualified and enthused to go out and sell more Simonds Products. It is believed that the miniatures will inspire the company's own factory workmen to greater effort through greater interest. Only a very small percentage of men who have made certain products in the plant, have ever had occasion to see those products in operation, or even to see the types of machines on which they operate. The company is convinced that the effort and expense involved to make the Little Red Schoolhouse a reality, will be returned many fold.

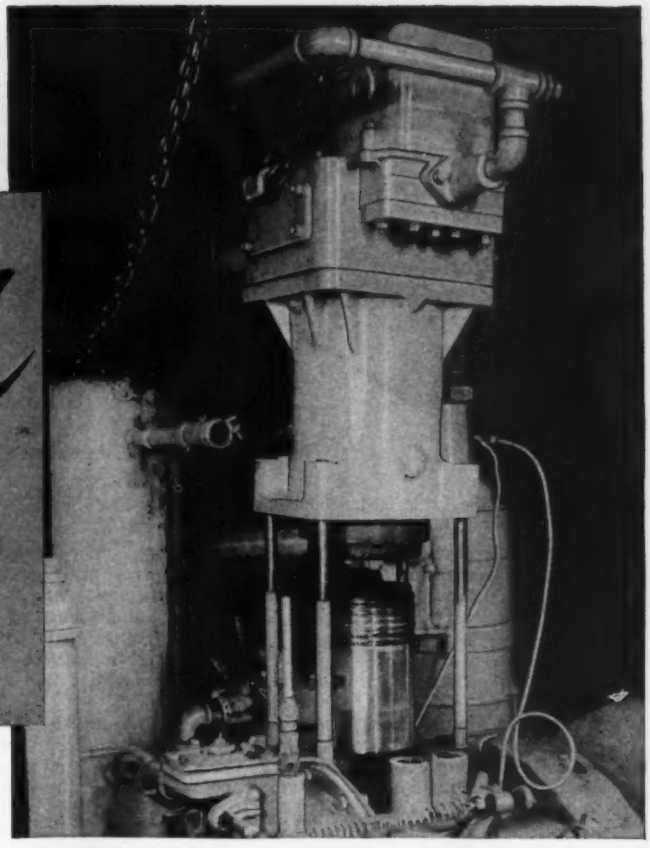
After a thorough study of the "Little Red Schoolhouse" the guests were conducted on a tour of the World's first Windowless Controlled Conditions Plant.

The activities formerly housed in three plants with 17¼ acres of floor area are carried on in this plant. In its 5¾ acres more items can be produced, operating two eight-hour shifts, than in the former plants with single shift operation.

Over 1,500 100-watt fixtures with 85-watt fluorescent tubes provide a lighting intensity of from 20 to 25-foot candles at the working level of 36 inches from the floor throughout the entire 200,000 square feet of area. Regardless of season, the weather conditions, or the hour of day or night, the amount of light in each location is always the same. Additional lights are provided at operations requiring greater intensity.

The temperature and relative humidity are controlled by four air conditioning units which provide 400,000 cubic feet of air per minute or five complete changes of air per hour.

Clean ... FROM EAST CHICAGO



At Sinclair Research Laboratories, East Chicago, Ind., skilled technicians specialize in keeping it clean ... for you.

With today's accent on the detergency qualities of engine lubricants, Sinclair Research is constantly making tests to determine the cleansing properties of motor oils, diesel lubricants, and other products, using the special "come-apart" single cylinder diesel engine shown above.

Such tests—duplicating actual operating conditions—constitute an essential part of Sinclair's outstanding research, which has resulted in the development of ever finer petroleum products for over 30 years. At its soon-to-be-completed new Research Center, Harvey, Ill., Sinclair will continue to develop industrial and automotive lubricants of outstanding performance with greater facilities, finer equipment, and more highly skilled personnel than ever before.

Sinclair Power Plant Lubricants
FOR MINIMUM FRICTION—MAXIMUM POWER
For Turbines:
SINTURLITE OILS
For Steam Cylinders:
SINCLAIR STEAM CYLINDER AND VALVE OILS
For Compressors:
RUBILENE OILS
For Ball and Roller Bearings:
BEARING GREASE AF

SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

SINCLAIR

Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

Heart of the Little Red Schoolhouse, it shows use of Simonds products

Seven artesian wells furnish 1,600 gals. of 52°F. water per minute to the spray nozzles in these units. The air is cooled and washed when passing through this spray.

Twelve complete changes of air per hour in the heat treating section where approximately 100 furnaces are located is made possible by a circulating system of air from out-of-doors at the rate of 200,000 cubic feet per minute and the same amount of warm air removed. The result is a circulating system within an air-conditioning system without any partitions other than curtains in the trusses around the furnace area.

Hammers, grinders, compressors and other pieces of heavy equipment are isolated from the plant floor by specially designed foundations which are surrounded with shock-absorbing insulation. This allows delicate precision testing equipment to be used in other parts of the plant without being affected.

The acoustic ceiling absorbs 93 percent of the sound coming in contact with it.

All machines are painted with an orange-yellow lacquer; all furnaces are painted aluminum; benches, tool, fixture and stock racks are olive green. The walls, ceiling and trusses are painted white. Supporting columns for trusses are painted black eight feet above the floor; the upper part is white. All doors are painted black. A black band nine inches high is painted on all walls next to floor. This color arrangement gives operators a pleasing color contrast with a large amount of reflected light. It also reduces maintenance costs as machines are kept cleaner.

Ability to control all operating conditions has enabled the Simonds management to set up eight self-contained production lines under one roof, each performing all the operations required to convert raw materials into finished products of a particular type under conditions conducive to high efficiency and the required uniform high quality of product. Thus, each of the several saws, knives and files made by the company move in a straight line through the sequence of toothing, milling, hardening, grinding, polishing and sharpening to finished stock bins and shipping platform under accurate control.

In laying out the flow of product through the different production lines, the shortest route possible was achieved. While the flow is not in one continuous straight line, it is in a series of straight lines which are constantly moving the product to the finished stock. With this arrangement, the distance some of the product moves at present is 2,230 feet less than under the former arrangement. This differs for different items but a reduction has resulted in all lines.

Nearly all equipment is self-contained with push-button control. Disconnect switches are provided on each unit to make it independent of other machines. Equipment can be located at any angle most suited to production without inconveniences.

The plant is 560 feet long, 360 feet wide and 28 feet high. It has an open clearance from the face or underside of the steel trusses of 18'-0" to the floor. The floor area is 200,000 square feet and the cubical contents 5,000,000 cubic feet. The roof structure is supported entirely on steel trusses which were shop welded. Roof construction is of perforated hollow rib metal, filled with 1½-inch slab of rock cork and covered by two staggered ½-inch layers of insulating board and bonded water-proofing. Walls are of cinder block and brick with a dead air space between cinder block and the exterior brick. There are no light-transmitting materials used in the construction of roof or walls of the plant.

Heat-treating is done by gas and electricity which is furnished by the local public utility. Compressed air at 100 lbs. pressure is produced with electric driven compressors and distributed throughout the plant. Water is supplied from city mains for toilets, lavoratories, drinking fountains and boilers. Most of the water used for process is well water which has been previously used for air-conditioning.

Steam is used only for heat and is provided by three boilers located in the Stock Supply Building.

Grinding compound, quenching oil and other commodities are distributed from individual systems.

Direct current electricity is generated with a 400-kilovolt ampere generator set for supplying 115 volts and 230 volts direct current to magnetic chucks, direct current motors and other direct current applications.

Electric power to meet the plant's connected load of 8000 horse-power is provided by the local public utility company. All power entering the plant is controlled through a totally enclosed 75-foot "dead-front" steel switchboard situated just inside the west wall, beyond which are the transformer banks.

Seventeen thousand lineal feet of underfloor power ducts, 38,000 feet of piping, 60,500 feet of galvanized iron conduit and more than 30 miles of wire and cable have been installed in the building, where push-button controls are practically universal. These lines carry power, light, water, gas, steam and air direct to machine and furnace locations by passing above trusses, down columns and under the floor, leaving the working area clear. Central control of process piping is provided in the individual bays.

The entire floor area of the plant, other than foundations, has power ducts cast in the concrete floor. These run the long way of the plant and are spaced ten feet apart. Every two feet along the length of these ducts provision has been made for taking electric power out of the duct. This makes it possible to rearrange or install new equipment in much the same manner as a floor lamp can be moved about in one's home.

Every operation in our older plants was carefully surveyed to determine the fatigue of the operator in performing it. Overhead cranes, lifting devices, electric and gasoline powered portable trucks and cranes now reduce this to a minimum.

The Stock Supply Building, just completed, is more or less of conventional design. It has a band of windows, eight feet above the floor, which are ten feet high, extending entirely around it. As air-conditioning equipment was not available at the time this building was built, ventilating windows were provided. The frame structure is, however, like the windowless plant.

This building, as its name implies, is used for unfinished stock and other supplies, also for locker and wash rooms, as well as employees entrances.

A depressed railroad siding, which will take care of five railroad cars at one time, for unloading at floor level, is inside this building.

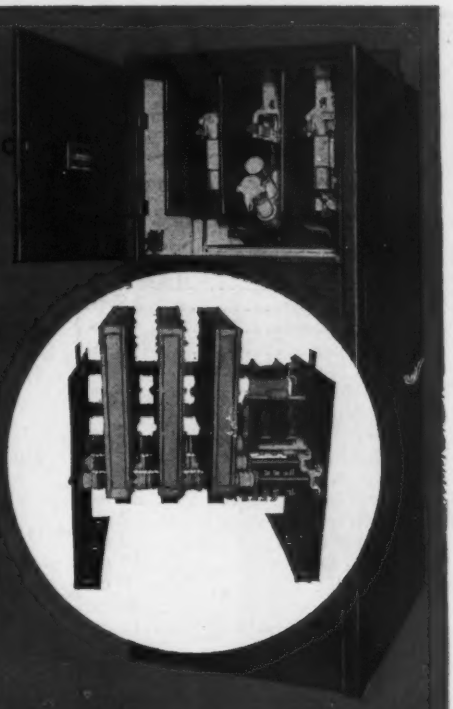
Receiving Department for all incoming goods is located here.

The building is attached to the rear of the Windowless Plant. The rear wall of the Windowless Factory separates it from the Stock Supply Building.

This building is 387 feet wide and adds 210 feet in length to the conditioned building. The column spacing is 70 feet x 40 feet. This spacing and the steel trusses are like those in the manufacturing building. There are 72,800 square feet of floor area with 16 columns supporting the roof.

Motors are hard to get...

Guard them with LIMITAMP CONTROL



Limitamp control is furnished as a single unit, in groups, or in special enclosures for special operating conditions.

Limitamp control can provide those hard-to-get motors with sure, short-circuit protection. In less than *one-quarter* cycle, Limitamp's EJ-2 fuses cut off a rise in current from a short, and clear it in one-half cycle—long before the short has time to harm the contactor or motor. Your plant's power system needs this prompt handling of fault currents, and you will avoid the risk of costly shutdowns that can result from just *one, mad short circuit.*

A STARTER AND PROTECTOR IN ONE CABINET

G-E Limitamp control consists of an airbreak contactor (the motor starter), and EJ-2 fuses (the short-circuit device). They are mounted in separate compartments of one, all-steel cabinet.

Airbreak contactors are specially designed for hard duty. Operating experience has proved they furnish long-lived, low-cost service with only routine maintenance.

Because they operate in air, they eliminate the problem of handling oil. And tip life of airbreak contactors is many times that of comparable oil-immersed tips.

You can depend on EJ-2 fuses for sure, short-circuit protection. They are "fail-safe" devices. There is nothing about them to wear. They are easy to replace.

OVERLOAD AND UNDERVOLTAGE PROTECTION

Isothermic overload relays, accurately calibrated against actual motor characteristics, guard the motor against overheating from sustained loads or single phasing.

FACTORY-ASSEMBLED CONTROL

Factory-assembled in one cabinet, Limitamp is easy to install, easy to co-ordinate with other control, saves space, and improves the appearance of your plant.

The Trend is to **AIR**

G-E LIMITAMP . . . THE FIRST HIGH-VOLTAGE CONTROLLER WITH AIRBREAK CONTACTORS

GENERAL ELECTRIC

MAIL THIS COUPON!

Apparatus Department,
General Electric Company, Section P676-251
Schenectady 5, New York

Please send me Bulletin GEA-4247 on Limitamp control.

Name.....

Company.....

Address.....

IMPORTS

NEW YORK IMPORTS

WEEK ENDING DECEMBER 6, 1947

SUMMARY

Newsprint	21,825 rolls
Cigarette Paper	8 cs.
Coated Paper	19 cs.
Photo Paper	116 cs.
Writing Paper	3 cs.
Filter Paper	19 cs.
Wallpaper	6 cs.
Drawing Paper	10 cs.
Sulphite Paper	608 rolls
Parchment Paper	3 cs.
Cardboard	21 cs.
Paper Serviettes	2 cs.
Wrapping Paper	2 cs.
Tracing Cloth	19 cs.
Wallboard	1 cs.
Gummed Paper	49 cs.
Tissue Paper Caps	11 cs.
Miscellaneous Paper	2 cs., 48 rolls, 1 pkge.

NEWSPRINT

Bankers Trust Co., Vardulia, London, 70 rolls (Finland).

N. Y. Journal American, Markland, Liverpool, N. S., 737 rolls.

N. Y. Herald Tribune, Markland, Liverpool, N. S., 1727 rolls.

N. Y. World Telegram, Markland, Liverpool, N. S., 426 rolls.

Herald Statesman, Inc., Markland, Liverpool, N. S., 56 rolls.

Brooklyn Eagle, Markland, Liverpool, N. S., 739 rolls.

Washington Post (Alexandria, Va.), Markland, Liverpool, N. S., 2692 rolls.

Alexandria Gazette (Alexandria, Va.), Markland, Liverpool, N. S., 30 rolls.

Washington Daily News (Alexandria, Va.), Markland, Liverpool, N. S., 327 rolls.

Montmorency Paper Co., Keguns, Botwood, N. F., 6191 rolls.

News Syndicate Co., Colabee, Baie Comeau, 6769 rolls.

H. G. Craig Co., G.D.D., Donnacona, 332 rolls.

Montmorency Paper Co., Brigus, Botwood, N. F., 1690 rolls; 1729 rolls (to Alexandria, Va.).

CIGARETTE PAPER

J. Victori, Habana, Barcelona, 3 cs.

Suarez & Crespo, Exiria, Alicante, 5 cs.

COATED PAPER

F. P. Gaskell, Elysia, Glasgow, 19 cs. (for cigarette tips).

PHOTO PAPER

J. J. Gavin Co., Vardulia, London, 4 cs.

American Express Co., American Shipper, London, 48 cs. (base).

Lep Transport, Inc., American Shipper, London, 10 cs. (base).

E. I. du Pont de Nemours & Co., American Shipper, London, 54 cs. (base).

WRITING PAPER

F. L. Kraemer & Co., Vardulia, London, 3 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., Vardulia, London, 14 cs.

H. Reeve Angel & Co., Inc., America, Southampton, 5 cs.

WALLPAPER

Hudson Shipping Co., America, Southampton, 6 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., Vardulia, London, 4 cs.

Green Kriegsman Paper Co., America, Southampton, 6 cs.

SULPHITE PAPER

Elgin Paper Co., Gripsholm, Gothenburg, 20 rolls.

Jacobi Supply Co., Gripsholm, Gothenburg, 421 rolls.

Resolute Paper Products Corp., Gripsholm, Gothenburg, 164 rolls.

C. H. Kent, Gripsholm, Gothenburg, 3 rolls.

PARCHMENT PAPER

George Lippelgoes, Jefferson City Victory, Antwerp, 3 cs.

CARDBOARD

F. C. Strype, Mount Mansfield, Genoa, 21 cs.

PAPER SERVIETTES

H. W. Robinson Co., Vasconia, London, 1 cs.

Rike Kimber, American Importer, Liverpool, 1 cs.

WRAPPING PAPER

Sandvik Steels, Inc., Gripsholm, Gothenburg, 2 cs.

TRACING CLOTH

E. Dietzgen & Co., Torr Head, Liverpool, 19 cs. (bleached cotton).

WALLBOARD

A. Decaris & Co. (Montreal), Gripsholm, Gothenburg, 1 cs.

GUMMED PAPER

B. F. Drakenfeld & Co., American Importer, Liverpool, 49 cs.

TISSUE PAPER CAPS

Drueding Bros., Pres. Polk, Genoa, 11 cs.

MISCELLANEOUS PAPER

Wedeman & Godknecht, Argentina, Copenhagen, 2 cs.

Whitehall Shipping Co., Gripsholm, Gothenburg, 48 rolls.

Nils Troedsson, Gripsholm, Gothenburg, 1 pkge.

RAGS, BAGGINGS, ETC.

Green Textile Associates, Pierre Victory, Antwerp, 156 bls. cotton waste.

Atlas Waste Manufacturing Co., Persian Knot, Havanna, 23 bls. cotton waste.

A. W. Fenton, Exiria, Leghorn, 165 bls. paperstock.

Chase National Bank, Durango Victory, Antwerp, 107 bls. old jute bagging.

Midwest Waste Material Co., Marit Maersk, Antwerp, 62 bls. camouflage strips, 344 bls. scrap burlap bagging, 79 bls. bagging, 123 bls. jute baggings.

J. Berlage, Marit Maersk, Rouen, 40 bls. rags.

Irving Trust Co., Marit Maersk, Rouen, 189 bls. bagging.

Price & Pierce, Ltd., Markland, Liverpool, N. S., 222 bls. paper waste.

National City Bank, Bastia, Naples, 409 bls. old dark cotton rags.

National Shawmut Bank, Boston, San Miguel, Oporto, 84 bls. cotton waste.

E. J. Keller Co., Inc., Mount Mansfield, Bombay, 200 bls. old jute rags.

Buffalo Batt & Felt Corp., Mount Mansfield, Bombay, 250 bls. cotton waste.

Brandwein Mazur Co., Mount Mansfield, Bombay, 100 bls. cotton waste.

A. W. Fenton Co., Pres. Polk, Naples, 126 bls. old dark cotton rags, 137 bls. grey military cottons.

Royal Manufacturing Co., Southland, Antwerp, 58 bls. cotton waste.

E. J. Keller Co., Inc., Sobieski, Naples, 270 bls. dark cotton rags.

Amicale Woll Service, Sobieski, Naples, 363 bls. dark cotton rags.

Continental Bank Trust Co., Explorer, Haifa, 103 tons old bagging.

OLD ROPE

(———), Explorer, Calcutta, 484 bls. old hemp rope cuttings.

R. L. Pritchard Co., Explorer, Calcutta, 60 bls. old hemp rope cuttings.

CHINA CLAY

All Rite Trading Co., Jefferson City Victory, Antwerp, 3 bags.

GLUESTOCK

John Gorvers, Bresle, Pto Plata, 384 bdls.

National City Bank, Pres. Polk, Hong Kong, 67 bls.

Transatlantic Animal By-Products, Inc., Pres. Polk, Honk Kong, 100 bls.

WOODPULP

Price & Pierce, Ltd., Markland, Liverpool, N. S., 2132 bls. unbleached sulphite pulp.

O. V. Kohorn, Gripsholm, Gothenburg, 1 case woodpulp.

Castle & Overton, Inc., Gripsholm, Gothenburg, 1523 bls. dry sulphite pulp.

BOSTON IMPORTS

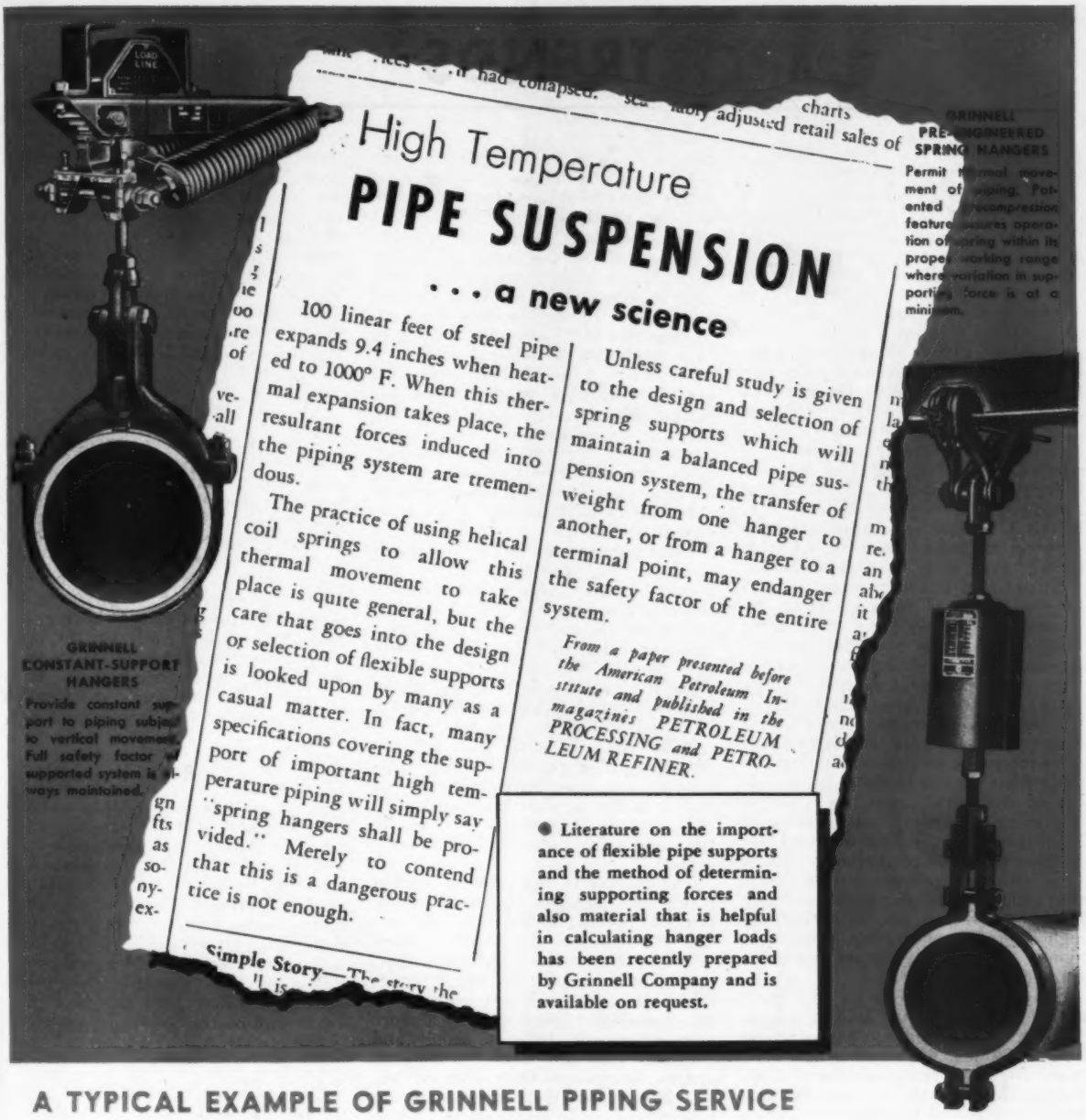
WEEK ENDING DECEMBER 6, 1947

Concentra Shipping Co., Mount Mansfield, Genoa, 36 bls. dark cotton rags.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 6, 1947

Elof Hansson, Bloomington Victory, Gothenburg, 1968 bls. dry viscose rayon pulp.


High Temperature
PIPE SUSPENSION
. . . a new science
100 linear feet of steel pipe expands 9.4 inches when heated to 1000° F. When this thermal expansion takes place, the resultant forces induced into the piping system are tremendous.
The practice of using helical coil springs to allow this thermal movement to take place is quite general, but the care that goes into the design or selection of flexible supports is looked upon by many as a casual matter. In fact, many specifications covering the support of important high temperature piping will simply say "spring hangers shall be provided." Merely to contend that this is a dangerous practice is not enough.
Unless careful study is given to the design and selection of spring supports which will maintain a balanced pipe suspension system, the transfer of weight from one hanger to another, or from a hanger to a terminal point, may endanger the safety factor of the entire system.
From a paper presented before the American Petroleum Institute and published in the magazines PETROLEUM PROCESSING and PETROLEUM REFINER.
● Literature on the importance of flexible pipe supports and the method of determining supporting forces and also material that is helpful in calculating hanger loads has been recently prepared by Grinnell Company and is available on request.
GRINNELL CONSTANT-SUPPORT HANGERS
GRINNELL PRE-ENGINEERED SPRING HANGERS

A TYPICAL EXAMPLE OF GRINNELL PIPING SERVICE

COMPLETE . . . EVERYWHERE

Products Manufactured
Pipe and Tube Fittings
Engineered Pipe Hangers
Prefabricated Piping
Grinnell-Saunders Diaphragm Valves
Thermolier Unit Heaters
Job Work Casting
Automatic Sprinklers and Special Hazard Fire Protection System
Amco Humidification and Cooling Systems
Other Piping Specialties

Supplier of . . .
Pipe, Valves and Fittings Specialties for Plumbing, Heating, Water Works and General Piping

GRINNELL COMPANY, INC.
Executive Offices
PROVIDENCE 1, RHODE ISLAND

GRINNELL

WHENEVER **PIPING** IS INVOLVED

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, December 10, 1947.

The week's news consisted largely of confirmation of price rises: Canadian newsprint and pulp, domestic sulphite writing and book papers—all predicted, all justifiably explained, and therefore non-surprising.

That it has been the sincere desire of Canadian newsprint manufacturers to avoid price rises as long as possible was demonstrated this week when one of the major producers informed its customers that the present contract price for standard newsprint would remain unchanged through the first two months of 1948; at the same time advising that an advance of substantial amount might be unavoidable next March 1 because of continuing sharp advances in production costs. "A later action," they said, "will depend upon what develops in this respect, particularly with regard to wage rates, increased costs of wood and other materials. If there is no relief for advancing costs we shall have no choice from your standpoint as well as ours but to adjust our prices accordingly. We believe the program stated above demonstrates that our aim is to avoid price increases, to achieve stability and to do what we can to check the spiraling of costs and prices. We believe that every commodity seller and every buyer also has a public responsibility to resist destructive inflationary trends. It is with this in mind that in deferring action to meet our higher costs by higher prices we are foregoing the higher profit opportunity which obviously exists in the current newsprint market."

Sharply on the heels of this came notice that two other leading manufacturers had moved into higher prices with a $6 per ton increase on contracts for the first six months of 1948, commenting that the increase is absolutely essential to maintain production at the highest possible level.

The direction which other large producers will follow is not yet indicated. An increase of $6 per ton will bring the contract price for 80 percent of United States consumption of newsprint to $96, a $12 per ton rise over last January - February price. Such small amounts of newsprint as are purchasable on the New York market range, however, from $200 a ton upwards, some being quoted even higher f.o.b. Scandinavian ports.

Further information on first-quarter prices for Canadian pulp reported advances of $5 to $10 a ton on unbleached sulphite and kraft. Commenting on the world's pulp supply, *The World's Paper Trade Review* says that Canada has a shortage of pulp, that waste paper is being used in mills where before the war wood pulp was the only raw material; also that some mills are obliged to bring wood 4/600 miles to their plants for conversion. Further, suggesting the trend prices are likely to take in Scandinavian countries, this same publication says: "Even higher prices could probably be obtained from distant markets and buyers who are in desperate need of pulp; but the Norwegian mills have to a large extent followed the policy of reserving most of their production for old customers at regular market prices, although pulp wood, chemicals, labor, fuel, maintenance costs, et cetera, have risen considerably. Furthermore, the prices must show a certain compensation for being able to run at only half capacity owing to the scarcity of timber."

Price increases of $20 a ton on sulphite writing and book paper announced by five large mills this week reflect increasing costs of production, raw materials, and "certain compensation for being able to run at about half capacity" because of the scarcity of pulp, since it is in this field of the industry that the shortages of market pulp and high prices for what is obtainable are most acutely felt. Reports that there is more market pulp in inventory are considered correct; but that it is not so distributed that mills can operate at capacity is likewise true, and many mills are badly handicapped.

The market in the sulphite writing paper field has not improved in the last six months, nor is there evidence that it can before the middle of next year at the earliest. At that time, providing the supply of pulp is maintained on a par with this year's, it is anticipated that there may be a more even adjustment between supply and demand. The past week's backlog of orders is greater than that of six months ago, and there is no reason to expect any quick improvement in this condition.

Likewise the demand for 25 percent rag content continues very strong with the mills unable to fill orders because of the lack of sulphite pulp. A definite slackening is reported in the higher grades of rag content, 100, 75 and 50 percent, and it is considered likely that a buyers' market may develop in this field after the first of the year, although no drop in prices is seen as possible while pulp and rags continue at such levels.

Wood Pulp

Imports of wood pulp in increasing quantities are reaching American buyers through Canadian ports via rail from Quebec to United States points. Within 48 hours after arrival, the ship's load is released for shipment, a considerable advantage over normal arrivals at Atlantic ports where importers run into innumerable difficulties regarding storage and handling through badly congested ports. It is expected that all-rail shipments from Quebec will replace or supplement prewar lake routings from Montreal. . . . Total 1947 imports are estimated at 557,000 *tons* rather than *pounds* as erroneously carried by this column, November 27.

Waste Paper

Seasonal conditions such as the heavy department store flow of waste, mills' end-of-the-year disposition to move out stocks, and heavy collections had slowed up the market considerably this week; and while some anticipated a drop in prices as result of these abundant stocks, prices are holding firm. Higher grades are in strong demand with prices firm. Shaving and manila tabulating cards are in especially heavy demand with stocks moving freely. Kraft is sluggish. It is estimated that the year's consumption of waste paper will aggregate 8,300,000 tons.

Rags

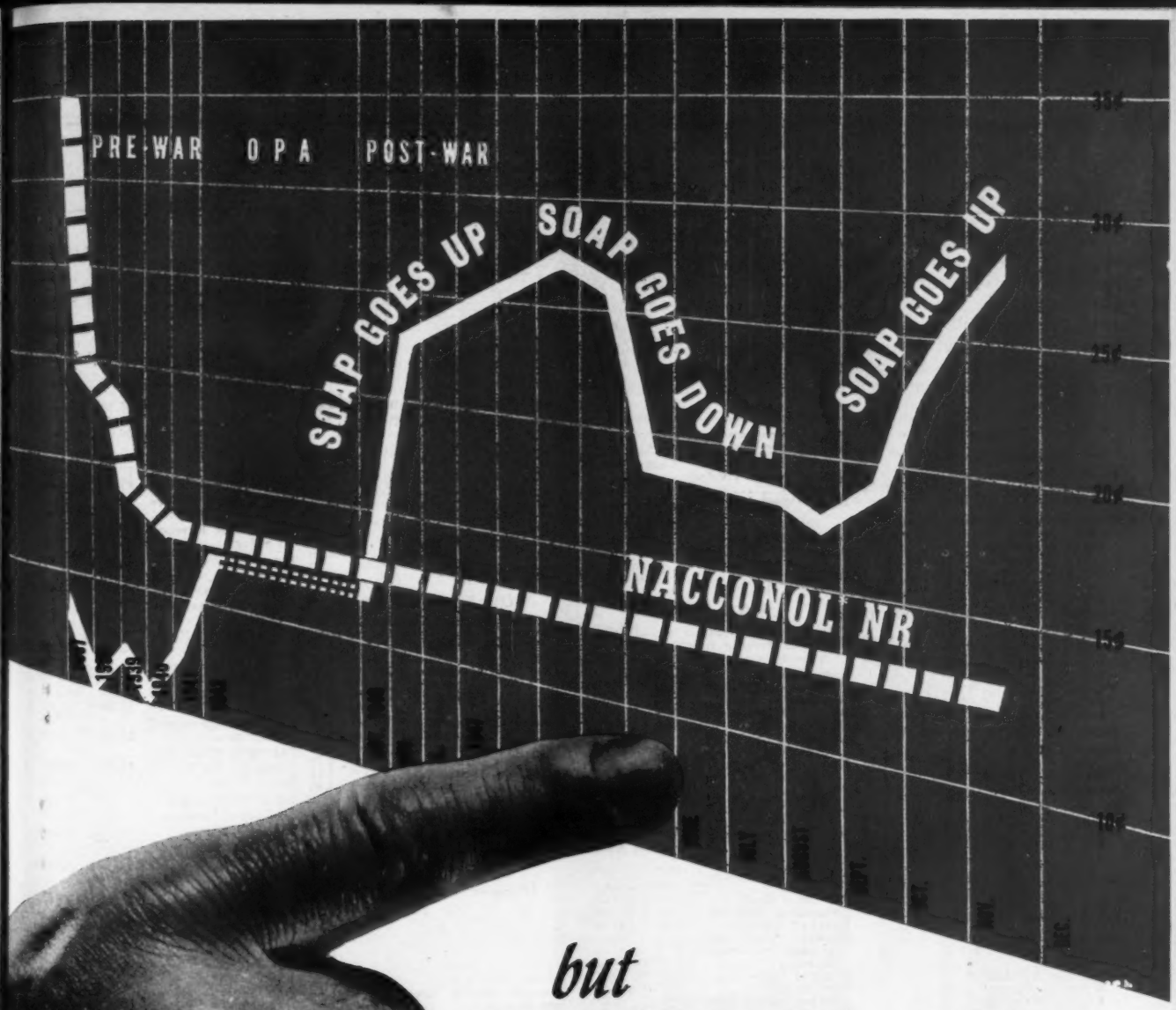
A scarcity of new cottons particularly accounts for the strong undertone to this market. Quantities are moving out steadily and demand is strong. The quiet tone of the old rag market is reported as "pre-holiday" and seasonal. Prices reflect a strengthening this past week with dealers holding present figures. Old bagging continues in good demand with prices strong. Roofing rags are now firm again with no further decline expected.

Index

The index of general business activity for the week ended November 29 dropped to 150.8 from 152.9 in the preceding week, compared with 132.6 for the corresponding week of 1946. The index of paperboard production rose to 194.4 from 185.2 in the preceding week, compared with 185.5 in the corresponding week of 1946.

Paper production for the week ended November 29 was estimated at 108.5 percent, compared with 111.9 (revised figure) for the preceding week, with 103.0 for the corresponding week of 1946, with 97.5 for 1945, and with 91.0 for the corresponding week of 1944.

Paperboard production for the week ended November 29 was 100.0 percent of capacity, compared with 102.0 for the preceding week, with 94.0 for the corresponding week of 1946, with 96.0 in 1945, and with 94.0 for the corresponding week of 1944.



but

NACCONOL NR

still

COSTS LESS THAN SOAP

DOES MORE THAN SOAP

Control your costs by specifying NACCONOL NR

Additional production now available for your complete detergent needs. Inquiries Invited.

*Reg. U.S. Pat. Off.

National Aniline DIVISION · ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR ST., NEW YORK 6, N.Y. · BOSTON · PROVIDENCE · PHILADELPHIA · CHICAGO · SAN FRANCISCO · PORTLAND, ORE. GREENSBORO · CHARLOTTE · ATLANTA · NEW ORLEANS · CHATTANOOGA · TORONTO

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—

Roll, contract	$87.50	to	$90.00
Sheets	$109.00	"	—

Kraft—per cwt.—Carload Quantities Zone A Deld. 40 lb. base wgt.

Superstandard Wrapping	$9.00	to	—
No. 1 Wrapping	6.75	"	7.50
Standard Wrapping	6.50	"	7.25
Standard Bag	6.00	"	7.00

Tissues—Per Ream 24x36 (480) 11 lb. Zone 1.

Wh. No. 1 Frd.	$1.75	to	$2.00
Wh. No. 1 M. G.	1.75	"	2.00
Wh. No. 1½	1.60	"	—
Wh. No. 2	1.55	"	—
Kraft Anti-Tar	1.38½	"	—
Kraft Unbl.	1.85	"	—
Manila No. 2	1.62	"	—

Toilet—Per Case of 100 rolls—1 M Sheets.

Unbleached	$5.50	to	$6.40
Bleached	6.50	"	7.60

Paper Towels—Per Case of 3750—Zone 1.

Wh. Jr. M'tif'd 9¼x9½	$4.85
Br. Sr. M'tif'd 10x12	3.45
Br. Jr. M'tif'd 9½x9¼	2.95
Br. Jr. Sgl. fold 10x10¼	3.10

Manila—per cwt.—C. l. f. a.

No. 1 Jute Tag	$14.50	to	—
Reg. Jute Manila	13.25	"	$15.50
No. 1 Manila	9.75	"	—

Boards, per ton—

News	$92.50	"	—
Chip	90.00	"	—
Sgl. Mls. L1 Chip*	102.50	"	—
White Pat. Coated*	120.00	"	—
Kraft Liners 42 lb.	100.00	"	—
Binders Boards	126.00	"	—

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1: Rag Content Bonds and Ledgers—

White, Assorted Items Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	38.00	34.55	33.10
50% Rag	31.50	28.75	27.50
25% Rag	28.00	25.50	24.50

Ledgers, per cwt.

100% Rag Ext. No. 1	$54.25	$50.00	$48.00
100% Rag	$47.50	$43.90	$42.10
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Sulphite Bonds and Ledgers—White, Assorted Items Bonds, per cwt.

No. 1	$19.25	$17.50	$17.00
No. 2	18.25	16.50	16.00
No. 4	17.50	16.00	15.25

Ledgers, per cwt.

No. 1	$20.25	$18.35	$17.60
No. 2	19.25	17.50	16.80
No. 4	18.50	16.90	16.10

Free Sheet Book Papers—White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated	$20.40	$19.55
No. 2 Glossy Coated	19.15	18.30
No. 3 Glossy Coated	18.40	17.60
(Per cwt.)	Case	Ton
No. 1 Antique (Watermarked)	$15.90	$15.15
No. 2 Offset	14.15 to 17.90	13.65 to 17.10
A Grade E. F.	14.90	14.25
A Grade S. & S. C.	15.40	14.65
B Grade E. F.	Nominal	
B Grade S. C.	Nominal	

Wood Pulp

Domestic mill contract prices delivered with varying freight allowances.

	Per Short ADT
Groundwood	$75.00 to $81.00
Unbleached Sulphite	115.00 " 117.00
Bleached Sulphite	121.00 " 130.00
Bleached Soda	120.00 " —
Bleached Sulphate	Nominal
Unbleached Sulphate Northern	Nominal
Unbleached Sulphate Southern	Nominal

Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified:

	Per Short ADT
Select Unbleached Kraft (no freight allowance)	125.00 " —
Reg. No. 1 Kraft	112.50 " 115.00
Unbleached Sulphite	115.00 " 117.00
Bleached Sulphite	125.00 " 155.00
Glassine Unbleached Sulphite (no freight allowance)	112.00 " —
Bleached Soda	120.00 " —
Groundwood	75.00 " 85.00
Siderums Pulping News	75.00 " 80.00
Hardwood and Specialty Grades	Nominal

Swedish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Kraft	170.00 to 195.00
Bleached Sulphite	175.00 " 185.00
Unbleached Sulphite	145.000 " 175.00
Unbleached Kraft	140.00 " 165.00

Finnish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Sulphite	$175.00 to —
Unbleached Sulphite	145.00 " 150.00
Unbleached Sulphate	140.00 " —

New Domestic Cotton Cuttings

(F.O.B. Shipping Point Plus Dealer's Commission)

White Shirt	$11.50 to	$12.00
Light Silesias	8.00 "	—
Unbleached Muslin	11.50 "	12.00
White Back Blue Overalls	9.00 "	9.25
Blue Overalls	8.00 "	8.50
Fancy Shirt	6.00 "	6.75
Light Percales	7.50 "	7.75
Light Prints	6.50 "	6.75
No. 1 Washables	5.00 "	—
Bleachable Khaki	7.00 "	7.50
Unbleachable Khaki	6.00 "	6.50
Cottonades	5.50 "	5.75

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.00 to —
No. 1 Whites Miscellaneous	4.00 " —
No. 2 Whites Repacked	3.50 " 3.75
No. 2 Whites Miscellaneous	3.00 " —
Blue Overalls	3.75 " —
Thirds and Blues Repacked	3.25 " —
No. 1 Roofing Rags	1.90 " 2.00
No. 2 Roofing Rags	1.75 " —
No. 3 Jute Bagging	1.60 " —
No. 4 Brussels and hard back carpets	1.60 " —
No. 5A Roofing Rags	1.80 " —

New Foreign Cotton Cuttings

(Prices to Mill, F.O.B. Dock, N. Y.)

	Per 100 lbs.		
New Dark Cuttings	$5.50	to	$5.75
New Mixed Cuttings	6.25	"	6.50
Light Silesias	9.25	"	9.50
Light Flannelettes	9.25	"	9.50
New White Cuttings	12.00	"	—
New Unbleached Cuttings	12.25	"	—
Fancy Shirt Cuttings	6.50	"	7.00
Light Prints	7.75	"	8.00
Bleachable Khaki, No. 1	7.00	"	7.50
Unbl. Khaki, No. 1	6.25	"	6.75

Old Foreign Rags

(Prices to Mill, f.o.b. dock, N.Y.)

	Per 100 lbs.		
No. 1 White Linens	$14.00 to		16.00
No. 2 White Linens	12.00 "		13.00
No. 3 White Linens	8.00 "		9.00
No. 4 White Linens	8.00 "		9.00
No. 1 White Cottons	10.00 "		12.00
No. 2 White Cottons	8.00 "		9.00
No. 3 White Cottons	6.50 "		7.00
No. 4 White Cottons	5.00 "		5.50
Extra Light Prints	7.50 "		8.00
No. 1 New Light Prints	6.25 "		6.75
Med. Light Prints	5.25 "		5.75
Dutch Blue Cottons	5.25 "		5.50
Checks and Blues	4.00 "		4.25
Linsey Garments	3.00 "		3.75
Dark Cottons	2.20 "		2.60
Old Shopperies	2.50 "		3.00
New Shopperies	2.50 "		3.00

Bagging

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs.		
Foreign Gunny, No. 1	$5.50 to		$5.75
Domestic Gunny, No. 1	6.25 "		6.50
Light Wool Tares	5.75 "		6.25
Heavy Wool Tares	5.75 "		6.25
No. 1 Scrap Bagging	5.50 "		5.75
Foreign Manila Rope	6.00 "		6.75
Domestic Manila Rope	5.75 "		6.50
Jute Strings	4.50 "		5.00
No. 1 Sisal Strings	5.50 "		6.00
Mixed Strings	1.75 "		2.50
Mixed Strings, Outthrows	.90 "		1.10

Waste Paper

Base Prices to Mills for Average Packings

(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	135.00 to		165.00
No. 1 Hard White Envelope Cuts	145.00 "		155.00
No. 1 Hard White Shavings, unruled	145.00 "		155.00
No. 1 Hard White Shavings, ruled	110.00 "		130.00
Soft White Shavings, one cut	145.00 "		155.00
No. 1 Soft White Shavings	135.00 "		145.00
Soft White Shavings, Misc.	125.00 "		135.00
No. 1 Fly Leaf Shavings	45.00 "		—
No. 1 Groundwood Fly Leaf Shavings	30.00 "		—
No. 1 Heavy Books & Magazines	27.00 "		—
Mixed Books	15.00 "		20.00
No. 1 White Ledger	85.00 "		90.00
New Manila Envelope Cuttings, one cut	100.00 "		110.00
New Manila Envelope Cuttings	65.00 "		75.00
Extra Manilas	25.00 "		30.00
Mixed Kraft, Env. & Bag Cuttings	75.00 "		85.00
Kraft Envelope Cuttings	110.00 "		—
Triple Sorted, No. 1 Brown Soft Kraft	65.00 "		75.00
New Kraft Corrugated Cuttings	85.00 "		90.00
No. 1 Assorted Old Kraft	55.00 "		60.00
New Jute Corrugated Cuttings	27.00 "		—
Old 100% Kraft Corrugated Containers	45.00 "		50.00
No. 1 News	13.00 "		15.00
No. 1 Mixed Paper	11.00 "		13.00
Box Board Cuttings	12.00 "		14.00
White Blank News	75.00 "		80.00
Overissue News	18.00 "		20.00
Old Corrugated	25.00 "		26.00
Mill Wrappers	22.00 "		25.00

Twines

All Prices Nominal, F.o.b. Mill

(Soft Fiber)

Coarse Polished—India	.28¼ to		.29¼
Fine Polished—Fine India	.31¾ "		.36¼
Unpolished—			
Paper Makers	.24 "		.25½
Tube Rope	.24¾ "		.26¼
Wrapping	.30 "		.32
Cotton	.55 "		.70

(Hard Fiber)

Mex. Sisal	.21 "		.31
Manila (Reprocessed)	.28 "		.30

(American Hemp)

Polished Hemp	.36¼ "		.42
Unpolished	.29¾ "		.34

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—			
New White No. 1	.11	to	.12
New White No. 2	nominal		
Light Silesias	.07½	"	.08
Black Silesias, soft	.06½	"	.07
New Unbleached	.10½	"	.11¼
Washable Prints	.06½	"	.07
Washable No. 1	.05	"	.05½
Blue Overall	.07½	"	.08
Cottons—According to grades—			
Washable Shredding	.03½	"	.04
Fancy Percales	.06¾	"	.07¼
New Black Soft	nominal		
Khaki Cuttings—			
Unbleachable Cotton Cuttings	.06	"	.06½
Bleachable Cotton Cuttings	.07	"	.07½
Men's Corduroy	.05¾	"	.06
Ladies' Corduroy	.05	"	.05½
Cottonades	.05½	"	.06

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

White No. 1—Repacked	4.50	to	5.00
Mixed White	4.00	"	4.25
White No. 2—Repacked	3.50	"	3.75
Thirds and Blues—			
Miscellaneous	2.25	"	2.50
Repacked	2.75	"	3.00
Roofing Stock—			
Foreign No. 1	nominal		
Domestic No. 1	1.85	"	1.90
Domestic No. 2	1.75	"	1.80
Roofing Bagging	1.65	"	1.70
Old Manila Rope	6.25	"	6.50

Bagging

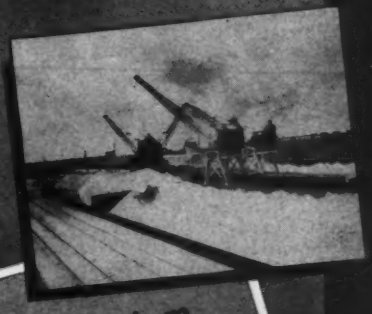
(F.O.B. Eastern Shipping Point)

Gunny No. 1—			
Foreign	nominal		
Domestic	4.75	to	5.25
No. 1 Clean Bright—Sisal Strings	.04	"	.04½
No. 2 Clean Bright—Sisal Strings	.03	"	.03¼
Sisal Jute	.02¾	"	.03
Scrap—			
No. 1	4.25	"	4.75
No. 2	1.75	"	2.00

SULPHUR

Large stocks carried at all times, permitting prompt shipments

Uniformly high purity of 99½% or better



Free of arsenic, selenium and tellurium

TEXAS GULF SULPHUR CO.
INC.

75 E. 45th Street New York 17, N.Y.

Mine: Newgulf, Texas

Wool Tares, heavy	4.75	"	5.00
New Burlap Cuttings	6.00	"	6.50

Old Papers

(F. o. b. Phila.)

Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	to	$115.00
No. 1 Hard White Shavings, unruled	100.00	"	—
Soft White Shavings, one cut	90.00	"	95.00
White Blank News	70.00	"	75.00
Soft White Shavings	80.00	"	—
No. 1 White Ledger	80.00	"	85.00
Ledger, Colored	67.00	"	70.00
No. 1 Heavy Books & Magazines	24.00	"	26.00
Overissue Magazines	nominal		
New Manila Envelope Cuttings	80.00	"	—
No. 1 Assorted Old Kraft	60.00	"	65.00
No. 1 Mixed Paper	11.00	"	12.00
Box Board Cuttings	10.00	"	11.00
Kraft Corrugated Cuttings	90.00	"	100.00
Old Corrugated	24.00	"	26.00
Overissue News	20.00	"	22.00
No. 1 News	13.00	"	15.00

BOSTON

Old Papers

(F.o.b. Boston)

Mill Prices, Baled

No. 1 Hard White Shavings, unruled	6.25	to	6.75
No. 1 Hard White Shavings, ruled	6.00	"	6.50
Soft White Shavings, Misc.	5.25	"	5.50
No. 1 Fly Leaf Shavings	1.75	"	1.85
No. 2 Fly Leaf Shavings	1.65	"	1.75
No. 1 Groundwood Fly Leaf Shavings	1.75	"	2.00
No. 2 Groundwood Fly Leaf Shavings	1.50	"	1.75
Mixed Colored Shavings	2.00	"	2.25
New Manila Envelope Cuts, one cut	4.50	"	4.75
Hard White Envelope Cuts, one cut	6.00	"	6.50
Triple Sorted No. 1 Brown Soft Kraft	3.75	"	4.00
Mixed Kraft Env. & Bag Cuttings	4.00	"	4.25
Kraft Envelope Cuttings	3.75	"	4.00
No. 1 Heavy Books & Magazines	1.25	"	1.75
New Manila Envelope Cuts, one cut	—	"	—
New Manila Envelope Cuttings	4.00	"	4.25
White and Colored Tabulating Cards	4.00	"	4.50
Groundwood Tabulating Cards	1.50	"	1.75
White Blank News	2.25	"	2.50
No. 1 Assorted Old Kraft	3.50	"	—
No. 1 Mixed Paper	.65	"	.75
Overissue News	1.00	"	1.25
Box Board Cuttings	.60	"	.70
New Corrugated Cuttings, Kraft	2.75	"	3.00
Old Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.10	"	1.25
Jute Corrugated Cuttings	1.07½	"	—
Paper Strings	2.00	"	2.25

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	—	to	4.75
Domestic	—	"	4.75
Sisal Rope No. 1	6.00	"	—
Sisal Rope No. 2	5.50	"	—
Mixed Rope	5.25	"	—
Mixed Strings	2.00	"	2.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	6.25	"	—
Soft Jute Rope	5.00	"	5.25
Jute Carpet Threads	6.00	"	—
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	—	"	4.75
Domestic	—	"	4.87½
South America	5.25	"	—
Wool Tares—			
Foreign	4.75	"	—
Domestic	4.75	"	—
Asst. Wool Pouches	5.00	"	5.25
New Zealand Wool Pouches	5.25	"	5.50
New Burlap Cuttings	6.00	"	6.50
Heavy Baling Bagging	5.25	"	5.75
Paper Mill Bagging	3.50	"	3.75
No. 1 Roofing Bagging	1.75	"	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.08	to	—
Fancy Percales	.07½	"	.08
New White No. 1	.11	"	.11½
New Light Flannelettes	.08	"	.08½
Canton Flannels, Bleached	.10	"	.11
Underwear Cuttera, Bleached	.10	"	.11
Underwear Cuttera, Unbleached	.11	"	.12
Silesias No. 1	.08	"	.08½
New Black Silesias	.05	"	—
Red Cotton Cuttings	.05	"	—
Blue Overalls	.08½	"	.09
Soft Unbleached	.11	"	.12
Blue Cheviots	.08½	"	.09
Fancy	.08	"	—
Washable	.06	"	—
Khaki Cuttings	.06¼	"	.07½
Corduroy	.03½	"	—
Khaki Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.10½	"	.11¼

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	to	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	2.00	"	—
No. 2	1.75	"	2.00
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	6.00	"	—

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

Mill Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	$110.00	to	$120.00
No. 1 Hard White Shavings, unruled	105.00	"	115.00
No. 1 Soft White Shavings	80.00	"	95.00
No. 1 White Ledger	85.00	"	93.00
No. 1 Heavy Books & Magazines	40.00	"	43.00
White Blank News	65.00	"	—
Mixed Kraft Env. & Bag Cuttings	75.00	"	83.00
No. 1 Assorted Old Kraft	45.00	"	55.00
Overissue News	28.00	"	—
No. 1 News	17.00	"	19.00
No. 1 Mixed Paper	13.00	"	14.00
Old Corrugated	25.00	"	27.00
Mill Wrappers	22.00	"	—

MARKETS

BLANC FIXE—Market strong. Supplies tight. Pulp is currently quoted at $90 per ton in barrels, car lots at works; by-products $72.50 per ton, car lots at works.

BLEACHING POWDER—Active demand. Market continues tight. Shortage of metal containers. Quotations unchanged. Prices range from $3.50 to $4 per 100 pound drums, l.c.l., works.

CASEIN—Market condition unimproved. Domestic production diminished. Buying slow. Current prices on processed acid precipitated casein at 32 to 33 cents per pound for domestic grades and 30 to 31 cents for imported grades, f.o.b. shipping point.

CAUSTIC SODA—No improvement in supply condition. Black marketing reported. Contracts being renewed on allocation policy. Solid caustic is reported at $2.85 per cwt.; flaked and ground is quoted at $3.25 per cwt. in 400 pound drums, $3.75 per cwt. in 100 pound drums—car lots at works; liquid 50% in tank cars at $2.25 per cwt.; liquid 73% in tank cars at $2.35 per cwt. at works.

CHINA CLAY—Domestic grades in good supply. Market steady. Domestic filled clay is currently $10 to $13 per ton, car lots, coating clay $15 to $30, imported clay from $18 to $35 export warehouse.

CHLORINE — Supply situation unimproved. Demand heightened with no supplies found for large orders. Scarcity is diverting orders to substitutes such as bleaching powder, ferric chloride, et cetera. Prices unchanged. Currently quoted at $2.25 per cwt. in single unit tank cars, and at $2.55 to $3.75 per cwt. in multi-unit tank cars, f.o.b. works.

ROSIN—Market quiet. Demand lighter. Price rises on higher grades. Gum rosin in drums per 100 pounds net in yard, New York car lots B, D, $9.75; E, F, $10.50; G, H, I, K, M, N, $11; WG, $11.05; WW, $11.15. Wood rosin, per 100 pounds, net, f.o.b., l.c.l., N. Y., B, $6.45; FF, $7.95; G, H, I, K, M, $10.56; N, $10.61; WG, $10.85; WW, $10.92; X, $11.10.

SALT CAKE—Demand continues ahead of supply with slight improvement in shipments. Prices remain unchanged. Domestic salt cake is quoted at $20 to $26.

SODA ASH—No easing of market. Mills substituting sodium bicarbonate to relieve situation. Current prices, car lots, per 100 pounds, are as follows: in bulk, $1.10; in paper bags, $1.30; and in barrels, $1.80.

SODIUM BICARBONATE—Supply shorter but still ample. Shortage of box cars delays shipment. Reported at $1.85 per cwt. paper bags, carload lots.

STARCH—Demand active both domestic and export. Prices strong and unchanged. Supply tight. Production at capacity. Pearl grade quoted at $6.52 per 100 pounds, powdered starch at $6.63 per 100 pounds, car lots, Chicago.

SULPHATE OF ALUMINA—Supply ample. Prices firm. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is quoted at $2 per 100 pounds in bags, car lots, at works.

SULPHUR—Demand steady. Supplies ample. Annual contracts are quoted at $16 to $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf ports is $17.50 to $19.50 per long ton.

TALC—No change in domestic market. Demand far in excess of supply. Domestic grades are currently quoted at $21 per ton in mines; Canadian at $35 and up per ton. All prices in car lots.

Quick-Change Artists

When a Fourdrinier grinds to a halt and plays dead for from three to five hours while the wire is being changed, down-time levies a brutal toll on a paper-mill's profits.

Obviously, then, when Moore & White announces that it can reduce this necessary fortnightly operation on high-speed paper-making machines to 30 minutes—oh's, ah's, cheers, and an immediate investigation are in order.

Let's translate the performance of the Moore & White quick wire-change Fourdrinier into increased tonnage, extra profits. A 1400-foot-per-minute newsprint machine, with a 160-inch wire, produces at the rate of some four tons per hour. Conservatively estimating the time saved on a quick-change Moore & White Fourdrinier at two hours for each biweekly wire change, that's eight tons of extra production every two weeks—at least *208 more tons per year*, at $90 per ton!

That comes to five figures—big ones—to perk up the balance sheet. Actually, you can expect this Moore & White advancement to liquidate its cost in the first six months of use. Ask us for proof.

The MOORE & WHITE Company

15TH STREET AND LEHIGH AVENUE • PHILADELPHIA 32, PA.

CUSTOM-BUILT MACHINES FOR PAPER MAKERS

See Paper Output Up In United Kingdom

(Continued from page 14)

and equipment will have been largely completed.

"Paper mills are well-equipped with standard and special paper-making machinery to manufacture practically all grades and classes of paper, including both wood-free and wood-fibrous papers. Many mills have their own research departments. The Imperial Institute in Kensington, London, is the official British Government laboratory for research in problems pertaining to paper and allied products.

"For some years the industry has been producing high-quality printing, writing and book paper from esparto grass imported from North Africa (Tunis, Algeria, and French and Spanish Morocco). The industry is centered largely in Scotland, where about 25 of the 39 mills making the paper are situated. Only recently have shipments of baled grass from North Africa been resumed. Reduction of the esparto fiber is attained by the soda process.

"Shortage of machinery, attributed to exportation in fulfillment of foreign tradetargets, has retarded recovery from war damage. Apparently no major plant expansion is planned for the immediate future; the industry is attempting, insofar as supply allows, to replace obsolescent or worn equipment. During the war years there was no normal replacement, although certain equipment for specialized purposes was built and installed.

"Between 1935 and the outbreak of the war there was considerable plant expansion. There were major developments in the manufacture of newsprint and new vegetable parchments, and at least two machines for making M.G. papers were installed.

"There was no alteration in the status of the Paper Control in 1946, or in the first 6 months of 1947. Consumption of raw materials and delivery of paper and paperboard is still under license. With the former wartime prerogatives in effect, the Control's supervision of the industry includes practically all phases of manufacture.

"It will be several years before the industry will be back to normal. It probably will be necessary to locate supplemental sources of woodpulp supply. The industry is restricted by the Government policy which tends to reduce foreign purchases to commodities which it determines to be essential."

Total wood pulp consumption for 1946 was given as 889,000 long tons, an increase of about 126 percent over 1945. This was attributed by Embassy informants to renewed availability of Scandinavian supplies. However, total pulp imports were somewhat below consumption requirements.

"In the basic prewar year from September 1, 1938, through August 30, 1939, the consumption of pulpwood amounted to 91,000 English cubic fathoms. In 1946, this consumption was down to 2,000 cubic fathoms. However, 47,000 tons of homegrown timber and 49,000 tons of wood waste were used in 1946.

"Consumption of esparto grass and straw in 1946 amounted to 385,000 tons, compared with 350,000 tons in the basic prewar year. During the war the percentage of straw rose greatly but now the industry is eliminating straw to a considerable degree. In 1935, 286,000 tons of esparto were consumed; straw is not included in this figure, and it is, therefore, not comparable with statistics for later years.

"Waste-paper consumption in 1946 amounted to 619,000 tons, as compared with 577,000 tons in the prewar year, and 413,000 tons in 1935. Its importance as a raw material is much less than during the war years and less paper actually is available.

"The United Kingdom consumed 134,000 tons of rags, old ropes, and similar items in 1946, as compared with 112,000 in the prewar year. In 1935, 45,000 tons of linen and cotton rags were consumed, 16,000 tons of other rags, and 34,000 tons of other fibrous materials, making a total of 95,000 tons.

"The consumption figures for 1946 have been used for the estimates of consumption of the various grades of wood pulp during 1947 since indications are that it will be approximately the same. A more precise estimate

PAPER EXPORT

IS A FULL TIME JOB!*

AND OUR ORGANIZATION IS GEARED TO DO THE JOB

For over 40 years the name *de Vries* has been associated with paper among buyers in all world markets.

For over 40 years the name *de Vries* has been synonymous with the export sales of leading paper mills.

E. de Vries Company

PAPER EXPORTERS ALL OVER THE WORLD

EDVECO 220 EAST 42nd STREET NEW YORK 17, N. Y. EDVECO

Cable address "Cellulose" New York

*Trade Mark
Copyright 1947 E. de Vries Company

THE owners of this streamlined speedster will be proud of its smart interior for years to come—because it is upholstered with a flexible plastic sheet made from one of the GEON polyvinyl resins. Like other products made from Geon, the combination of properties which it provides is not duplicated by other materials. This Geon upholstery is beautiful—pleasant to touch—highly resistant to wear—to fire, spray, moist air, oils, grease, gasoline, and acids. Soap and water keep it clean.

These valuable properties which Geon imparts are found in countless numbers of other products from shower curtains to tank linings, fly swatters

Beauty that needn't be pampered

to wire insulation, upholstery to highway markers.

It can be pressure or injection molded, calendered or cast into sheets or film. In solution or latex forms it can be applied as coatings or impregnants for fibers, fabrics, paper and cardboard. Products made from Geon may be flexible or rigid, clear or opaque, brilliantly or delicately colored.

Doesn't this suggest something to you that could be made better from Geon?

We make no finished products from Geon, or from any other raw materials manufactured by B. F. Goodrich Chemical Company. However, we'll be glad to work with you on any special problems of applications. We are particularly interested in developing new end uses for these materials. For more information please write Dept. U-13, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company · A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

cannot be made at this time because the purchase and shipping programs for pulp from Sweden have not yet been finally arranged (as of August 1947). Although paper production as a whole is thought to be less in 1947 than in 1946, it is expected that all the pulp available will be utilized.

"Estimates for pulp consumption in 1948 are put at 10 percent over 1946 and 1947, chiefly to indicate that it is the desire of the British paper and board industry to increase production. In view of the coal crisis and the obscure international pulp situation, it is impossible to arrive at a more accurate estimate.

"From indications by the trade and officials in the British Government, the annual physical capacity of the paper, paperboard, and building board industry has not altered materially from that of the basic prewar year, and any marked increase during 1948 is held to be unlikely. Capacity figures for the 12-month period ended August 1939 with comparable data for 1935 in parenthesis are as follows (in thousands of long tons): Paper, 2,045 (1,929); paperboard, 586 (321); and building and insulation board, 30 (8).

"The total production of paper increased by 43 percent in 1946 over 1945 and amounted to 1,255,000 long tons. Newsprint and the group entitled "Other printing and writing" were the two sections of the industry in which production expanded by more than the average. Total newsprint production increased by about 80 percent in 1946 over 1945—from 164,000 tons to 295,000 tons—but retained imports declined from 186,000 tons in 1945 to 105,000 tons in 1946. The production of other printing and writing papers rose by over 50 percent from 309,000 to 465,000 tons. In this case, too, imports declined from 1945 totals.

"A significant though easily explainable decline occurred in the manufacture of tissues, except cigarette. In this case production dropped by about 11 percent, from 27,000 tons in 1945 to 24,000 tons in 1946. However, imports of the papers falling within this classification were nearly 12 times greater in 1946 than in 1945.

"Production of all types of board increased in 1946 to 519,000 tons, an increase of 22 percent over the 1945 level of 427,000 tons. The only classification of boards which registered a production increase of more than the average was roofing paper (formerly classified as "Grey felt roofing paper" under "Boards"); this rose 57 percent —from 23,000 tons in 1945 to 36,000 tons in 1946.

"The estimates for paper and paperboard production in 1947 were based on the figures for the average weekly production of the various grades during 1946 and the early months of 1947. Production during the remainder of the year will be dependent largely upon the quantity of coal made available to the industry. The ration of coal for the period from June through October was the same as that for the corresponding period of 1946. However, the Board of Trade announced that the industry would be expected to set aside 3-weeks' supply for winter use, with the result that coal available for consumption was approximately 93 percent of the amount available in the corresponding period of 1946. This figure in most cases has been taken as the determining factor in production. It was assumed that coal would be supplied during November and December at 100-percent of the 1946 rate.

Midwestern Jobbers Go East To Visit Eastern's Mill

CHICAGO—Five midwestern paper jobbers left Chicago on December 2 for a short stay at the Bangor, Maine, mills of the Eastern Corporation. They were accompanied by Erwin L. Klim of the company's Chicago sales offices. Three of the jobber representatives, W. B. Pierce, John Palmer and J. W. Alexander, are with Bermingham & Prosser of Kansas City while two, Donald Sutton and Frank Koeteeuw, are representatives of Dixon & Company of Denver. The trip is one of a number arranged by Eastern to permit jobbers to visit the mills, inspect the latest Eastern mill operations and receive full information on the Eastern lines.

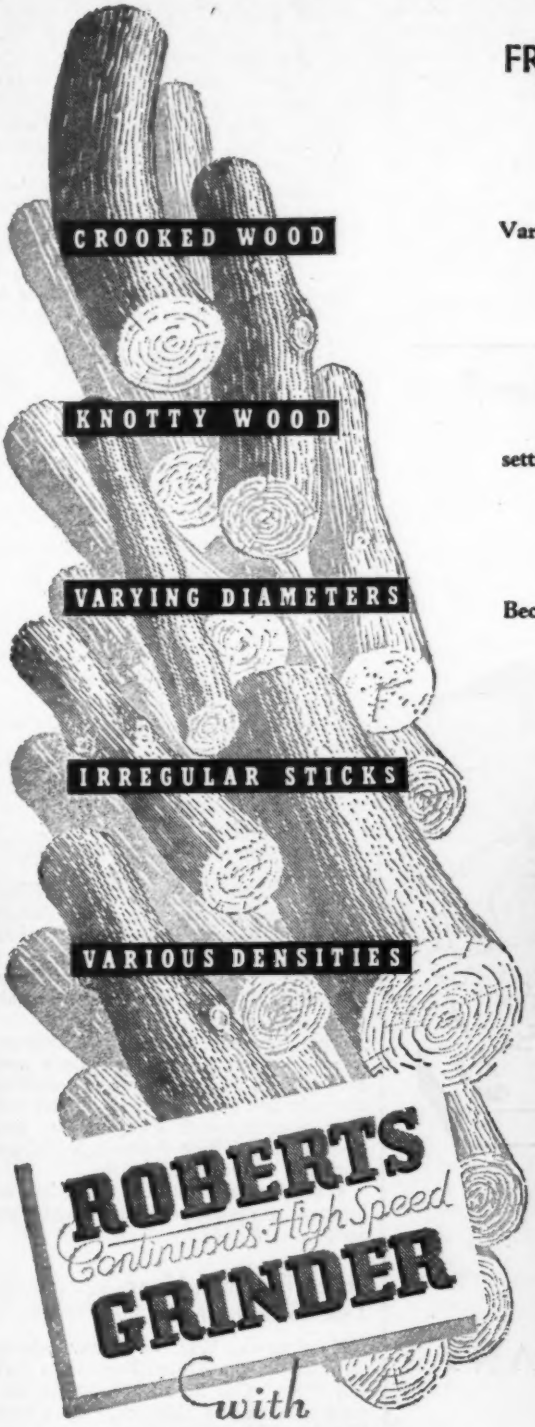
SUNOLITH
LITHOPONE
ASTROLITH
LITHOPONE
R.G. GRADE
ZOPAQUE
TITANIUM DIOXIDE
★
Proved results—for surface coating or beater addition

The recognized standard of Quality Pigments for The Paper Industry

THE CHEMICAL & PIGMENT COMPANY
Division of
The Glidden Company
BALTIMORE, MD. COLLINSVILLE, ILL.
OAKLAND, CALIF.

UNIFORM GROUNDWOOD PULP

FROM ALL KINDS OF PULPWOOD

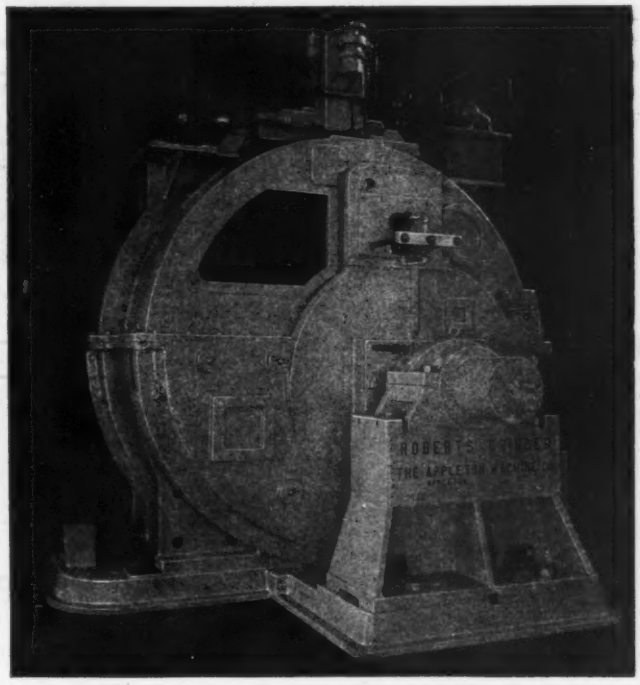


ROBERTS
Continuous High Speed
GRINDER
with
AUTOMATIC
LOAD CONTROL

UNIFORM high output, in grinding pulpwood, depends upon stable loading of the grinding stone. Variations in wood sizes, shapes and density and the shifting of the load tend to create slight changes in the wood area contacting the stone.

The rate of travel of the feed ring governs the pressure in the Roberts Grinder. Uniform grinding is maintained by Automatic Control at whatever setting is chosen for the load. As the load falls off, feeding is speeded up automatically, or in the case of overload, decreased. Any unbalance from the set position is instantly corrected. Because of this feature the Roberts grinds more pulp of higher quality and greater uniformity.

Pulpwood of any kind is readily ground into more uniform pulp, controlled to screen classification.



THE APPLETON MACHINE CO.
APPLETON, WISCONSIN • Sole Licensed Builders in the U. S. A.

Sales Representatives
CASTLE & OVERTON, INC., 630 Fifth Avenue, New York, N. Y.
PACIFIC COAST SUPPLY COMPANY, San Francisco, Portland

Chemical Exposition Lists Paper Names

(Continued from page 16)

mation of the diatom skeletons which is the principle raw material used in their products.

The Dorr Company had an excellent exhibit including models of various pieces of equipment, many of which are widely used in pulp mills.

General American Transportation Company had a large exhibit showing models of the large chemical processing equipment.

General Electric Company had an exhibit showing a few of their many types of motors and other electrical equipment.

The Norton Company had an interesting display of abrasives showing many methods of using their products.

The exhibit of Permutit Company included zeolite, zeo-carb and resin ion exchange types of water softening equipment.

The Powell Company displayed a varied assortment of valves and fittings at their exhibit.

The exhibit of Socony-Vacuum Oil Company included products such as lubricating oils, greases, waxes, and miscellaneous products used in manufacturing other chemicals.

Reichold Chemicals Incorporated displayed some of the wide variety of synthetic resins, pigments and protective coatings which they manufacture.

The display of Reliance Electric Company included motors, switchgear and electronic equipment.

United States Steel Corporation showed some of the equipment and illustrated a few of the great many uses for the steel which they provide to other industries.

Wallace and Tiernan Company displayed their latest types of chemical feeding equipment.

The Walworth Company proudly displayed a line of stainless steel valves which is a new addition to their already complete line of valves and fittings.

American Resinous Chemicals Company displayed emulsions of synthetic resins and elastomers for use in paper manufacturing and coating as well as for use in other industries.

Ansul Chemical Company illustrated the use of sulfur dioxide, methyl chloride, etc., for both laboratory and manufacturing usage.

The Goslin-Birmingham Manufacturing Company displayed models and illustrations of some of its large processing equipment for pulp and paper manufacture.

Grinnell Company, manufacturer of valves and fittings, displayed diaphram valves which are especially useful for handling corrosive liquids containing suspended matter.

Jeffrey Manufacturing Company exhibited a complete line of pulverizers, crushers, and hammer-mills.

National Tube Company displayed various types of tubing, pipes and fittings.

The exhibit of Oliver-United Filter Co. illustrated the types of filters which this company supplies to various industries.

Sprout Waldron Company exhibited attrition mills and illustrated their pulp and paper stock refiners.

The Sevenson Evaporator Company exhibit showed vacuum filters and evaporators which are widely used in the pulp and paper industry. Their display also included spray dryers and crystallizers which have a wide application in other industries.

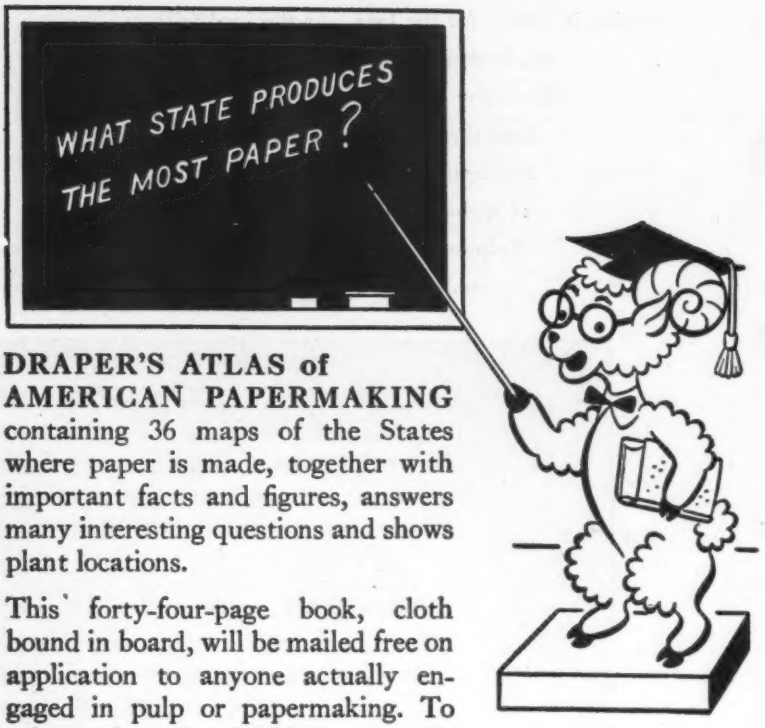
Worthington Pump Company had an interesting display of pumps and condensers.

Thilco Foremen Hear Talk on Enthusiasm

KAUKAUNA, Wis. — About ninety members of the Thilco Foremen's club and their ladies heard an address December 1 at the Elks club by Glenn Massman, executive secretary of the Dayton Foremen's club, oldest and largest of the clubs affiliated with the National Association of Foremen. It was the club's first annual ladies' night.

He called worry "unadulterated fear," and urged that it be replaced with faith, enthusiasm, ambition and resourcefulness.

What do you know about Paper?



DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 36 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

This forty-four-page book, cloth bound in board, will be mailed free on application to anyone actually engaged in pulp or papermaking. To others, the price is $2.00 postpaid, while the edition lasts.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

Ralph E. Briggs, Sales Manager

BRADFORD WEST, Pittsfield, Mass. — WILLIAM N. CONNOR, Jr., Canton, Mass. — L. H. BREYFOGLE, Kalamazoo, Mich.

WALTER A. SALMONSON, 519-20 White Bldg., Seattle, Wash. — L. L. GRIFFITHS, Jr., Kalamazoo, Mich.

Answer to Question No. 1—New York, 1,542,114 tons U.S. Census for 1945

paper parade . . .

Just before the Battle of Monmouth, soldiers were sent out in search of paper—a scarce item during the Revolutionary War. In a printing shop formerly occupied by Benjamin Franklin, they found 2500 copies of a sermon by a Reverend Tennent on "Defensive War." These were used for musket cartridges and "wadding" in the battle for old Tennent Church.

The sermon was delivered from the mouths of many muskets

The art of paper-making has had a romantic past. But the *business* of paper-making looks toward the future.

If high-grade *coated paper* is a consideration in your future plans, it will pay you to get acquainted with Wyandotte Precipitated Calcium Carbonate. This highly refined paper-coating pigment is unequaled in brightness and printability . . . in freedom from grit and abrasiveness . . . in that uniformity which is so essential to machine coating.

Wyandotte recently completed a great, new $2,000,000 plant to provide more of this superlative coating pigment so much in demand by the paper industry.

FOR TECHNICAL BULLETINS WRITE:

WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine • Hydrogen • Dry Ice • Glycols
Ethylene Dichloride • Propylene Dichloride • Chloroethers • Aromatic Sulfonic Acid Derivatives • Other Organic and Inorganic Chemicals

Wyandotte
REG. U. S. PAT. OFF.

EQUIPMENT AND SUPPLY NEWS

Chelsea Redesigns Utility Fan

This newly designed fan of unusually sturdy construction is used for equalizing temperature and humidity, for drying and cooling. It is especially adaptable to any processes that require speed-up cooling by air blast or require additional warm air, also to eliminate dampness by air circulation.

The totally enclosed motor is equipped with ball bearings so that this type fan can be operated in any position. It can be floor mounted without any additional support or can be suspended at any location and at any angle in order to direct the air flow in any desired direction. Blades are all steel, die stamped and die formed. It is equipped with safety guards, front and back, and an extension cord and plug, making it a convenient portable fan.

Available in two convenient fan sizes, the AA 20" fan delivers 3,000 c.f.m., and the AA 24" fan delivers 4,800 c.f.m. These fans are a product of Chelsea Fan & Blower Co., Inc., 1206 Grove Street, Irvington, New Jersey. Air delivery ratings are determined by the Standard Test Code of the Propeller Fan Manufacturers Association and the American Society of Heating and Ventilating Engineers.

Hercules Finds CMC Adds Strength to Board

WILMINGTON, Del.—Hercules CMC, sodium carboxymethylcellulose, is found to give added internal and surface strength to paperboard and added resistance to penetration of oils and waxes in paperboard, according to information released by Hercules Powder Company's Paper Makers Chemical Department. The added resistance to penetration of oils and waxes in paperboard results in higher quality gloss ink printing and a saving in ink and wax.

CMC was introduced to industry by Hercules in November, 1946 and paperboard manufacturers have been working with it for about a year. The Hercules CMC plant was the first American plant to begin commercial production of this water soluble cellulose gum. In a year's time CMC's properties have found application in a wide variety of other industries including textiles, protective coatings, ceramics, rubber, printing, and cosmetics.

Hercules' CMC for the paper industry is a free-flowing white, granular powder. It can be added at the calender stack or size press and may be used separately or in conjunction with conventional surface treating materials such as starch, wax, and wax-resin emulsions.

Mikro-Samplmill Marketed

NEWARK—A new specially designed popular priced mill for laboratory use in the grinding of analytical samples has been produced by Pulverizing Machinery Company, 24 Chatham Road, Summit, N. J., manufacturers of pulverizers and dust collector systems.

The new unit was developed in collaboration with representatives of the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture. Designed primarily for pulverizing analytical samples of fertilizing materials and mixtures up to 7 per cent of free moisture, and mixed feeds and grains, it performs with equal efficiency on roots, limestone, coal and other minerals, as well as on an inclusive range of chemicals, pigments, et cetera such as are processed with full-size pulverizer production units; and meets all the requirements for analytical use in industrial as well as governmental and other research laboratories.

Bench model Mikro-Samplmill

The Mikro-Samplmill is furnished in two models, a floor model with legs and ball-bearing casters which can be moved about for handy use in any part of laboratory or plant, and a laboratory bench model. Both have extension cord for plugging into a 110 volt line.

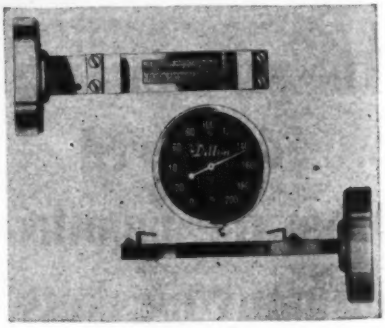
Manually-operated inclined feed screw assures feeding of complete sample into the grinding chamber. All parts of unit are so easily accessible that with reasonable care in cleaning, loss of material is negligible even in samples as small as 10 gms. The Mikro-Samplmill is furnished with screens having .039", 1/16", and 1/8" round perforations. Coarser or finer size screens are available from stock. The mill body, hinged cover, feed screw, clean-out door and feed hopper are of bronze. Interior parts such as mill housing liner, screens, and stamped patented one-piece rotor are all of stainless steel. Complete standardization in design of the unit provides for all stock parts being interchangeable.

The 3/4 hp. main drive motor and bearings are identical to those used in the Bantam Mikro-Pulverizer. Speed of the unit is 3,000 r.p.m. Extra pulley is included for 12,000 r.p.m. Weights: uncrated, bench model 125 lbs., floor model, 160 lbs.

Dillon Flat Stem Dial Thermometer

New in the thermometer and heat indicating field—something that is applicable to virtually *every* industry—is the DILLON FLAT STEM, dial type thermometer.

This instrument has been designed to clamp primarily onto *flat* or *rectangular* surfaces such as power bus-bars, switch blades, engine blocks, water jackets, et cetera. Conventional *round* stem thermometers are extremely difficult and usually impossible to attach in this manner. With this *flat* stem design, the heat element goes down snugly against the object under test and presents a *wide* heat absorbing area. Ordinary "C" clamps will hold it, or it can be *drilled* and *tapped* and screwed down in any desirable position. (Note brackets in photo used to secure it to power bus-bars.)



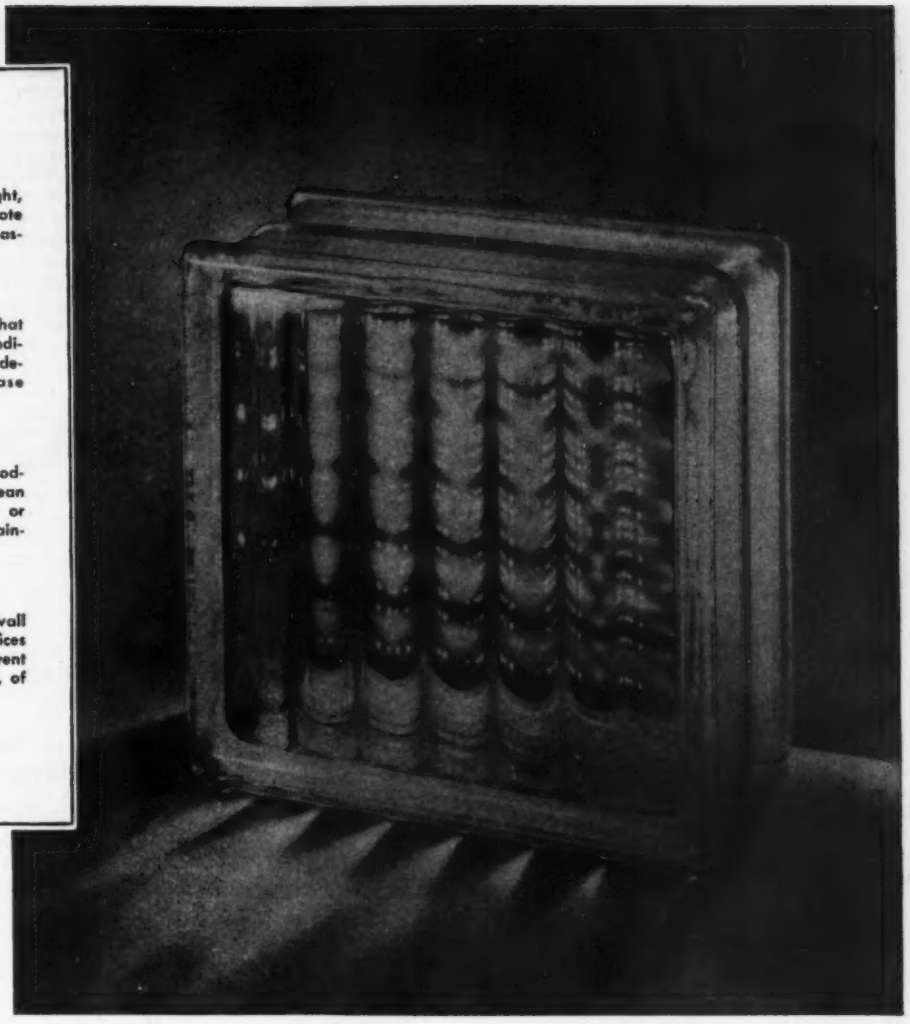
This new thermometer can be supplied in flat stems of varying widths, thicknesses, and lengths to meet the customers' requirements. Stems are available in a wide range of metals, and the following capacities are standard: 0-200° Fahrenheit, 50-500° Fahrenheit, 150-750° Fahrenheit, and 200-1000° Fahrenheit. 3" and 5" dials are also standard, and Centigrade ranges are available on order.

PC GLASS BLOCKS
provide ample, diffused daylight, which can be directed to remote working areas, thereby increasing usable floor space.

PC GLASS BLOCKS
possess insulating qualities that reduce heating and air-conditioning costs, help maintain desired temperatures, decrease condensation.

PC GLASS BLOCKS
give any building a neat, modern appearance. They clean easily, rarely need repairs or replacement, help reduce maintenance costs.

PC GLASS BLOCKS
form a solid, translucent wall which insures privacy for offices and work rooms. They prevent infiltration of chilling drafts, of harmful dust and grit.



One building material gives you all these advantages

● Plant managers who have installed PC Glass Blocks can tell you that they improve the appearance of the plant, set new high standards of efficiency, hold operating costs down to new lows. Whether you are planning for new buildings or for a modernizing program, be sure you have the latest information on PC Glass Blocks. Why not send the coupon today for our recent booklet? No obligation. Pittsburgh Corning Corporation also makes PC Foamglas Insulation.

PC GLASS BLOCKS...the mark of a modern building

PITTSBURGH PC CORNING ® GLASS BLOCKS

Distributed by PITTSBURGH PLATE GLASS COMPANY
by W. P. Fuller & Co. on the Pacific Coast and by Hobbs Glass Ltd. in Canada

FOR ADDITIONAL INFORMATION SEE OUR INSERTS IN SWEET'S CATALOGS

Pittsburgh Corning Corporation
Room 687, 632 Duquesne Way, Pittsburgh 22, Pa.
Please send along my free copy of your new book on the use of PC Glass Blocks for Industrial Buildings. It is understood that I incur no obligation.

Name_____

Address_____

City_____ State_____

Abitibi, International Lift Newsprint Price $6 a Ton

(Continued from page 7)

formation on the world's supply and demand for newsprint and wood pulp in view of the capacity and output of these countries.

Mr. Rowe's statement accompanies announcement of the declaration of the regular quarterly dividend on the Class A preferred shares of Great Lakes Paper Company, of 62½c payable December 31, 1947, to shareholders of record Dec. 12, 1947. Mr. Rowe adds that action on a common dividend will be taken at the directors' meeting early in January.

The optimism evidenced by Great Lakes Paper Company's president would seem to be justified by the reports of the various newsprint associations. The only factor limiting this optimism in the newsprint industry is the fact that the increased demand for newsprint and the lowering of inventories, particularly in the United States, is accounted for by the unprecedented demand for advertising space. A turn in the tide of general business might bring this intensive advertising to an abrupt end. One wonders just why there is this accelerating demand for advertising space in a market still short of consumer goods. Perhaps the coffers of advertisers were built up during the war years when all advertising was curtailed. More likely it is because general business conditions have been so favorable for such a long period that everyone has available funds for advertising.

In the meantime, the boxcar situation is reported to have improved and that, barring unusual weather conditions, there is not likely to be a repetition of last year's tie-ups. However, with several inches of snow already on the ground in Ontario and more on the way predicted, railroad men and shippers are counting up the boxcar supply. As of November 1, Canadian National and Canadian Pacific railways had a total of 102,390 boxcars in service, 926 more than at the same time last year. There were 9,667 more Canadian boxcars on U. S. lines than there were U. S. boxcars on Canadian lines, but this adverse balance has been substantially improved during recent weeks. The net result is that Canada has an increase of more than 2,000 boxcars available for service now as against the same date last year. Railway officials look for still further improvement by the end of the year. Railroad men still do not know just what effect Finance Minister Abbott's austerity program will have on shipping. Import restrictions imply that there will be a greater one-way traffic flow from Canada to the United States. This raises the question: Will the cars return from the U. S. empty or will they be held there for longer periods?

Speaking of the so-called austerity program (which bears very little resemblance to the British program), it seems to be taken for granted that anything in the way of machinery or equipment and a long list of other products, will require careful interpretation. In his radio address announcing the prohibition of importing certain products the minister of finance said: "The government will ask parliament to place an Excise Tax of 25% on a wide range of durable "consumer goods," the purchase of which can normally be postponed by the average family." He referred to these items as "home appliances." The Excise Branch of the Department of National Revenue has given at least these three rulings: "Under food or drink mixers, the tax will apply to dough mixers" (as used by bakers). Under "stoves, ranges and heaters," the tax will apply on bakers' ovens. Under "oil burners and oil burning equipment," the tax will apply to oil heated ovens. These items are neither "consumer goods" nor "home appliances."

Industrial machinery and machine tools will get close scrutiny by officials charged with reducing Canada's dollar imports. While there are many other items in the banned list, the only paper products noted are wallpaper, sandpaper and tarred paper.

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Shares. The offer is made only by the Prospectus.

211,861 Shares

Union Bag & Paper Corporation

Capital Stock

(without par value)

Rights, evidenced by Subscription Warrants, to subscribe for these shares have been issued by the Company to holders of its Capital Stock, which rights will expire at 3 o'clock p.m., Eastern Standard Time, December 16, 1947, as is more fully set forth in the Prospectus.

Subscription Price to Warrant Holders

$26 a Share

The several underwriters, including the undersigned, intend to offer shares of Capital Stock acquired by them pursuant to the underwriting agreement and through the exercise of rights at prices not less than the subscription price set forth above, and not above a price equal to the sum of the last sale price on the New York Stock Exchange during the current or the previous trading session and an amount equal to the Stock Exchange commission.

Copies of the Prospectus are obtainable from the undersigned only in States in which the undersigned is legally authorized to act as a dealer in securities and in which such Prospectus may be legally distributed.

MORGAN STANLEY & CO.

December 3, 1947.

River Power Seeks Building Permits

(Continued from page 7)

development, except in the spillway section. Located three and one-half miles northeast of Necedah, this dam will have a 555-foot concrete gated spillway, a powerhouse section and an earth section aggregating 8,500 feet in length, and earth dikes six and one-half miles long, creating a reservoir with an area of 21,000 acres.

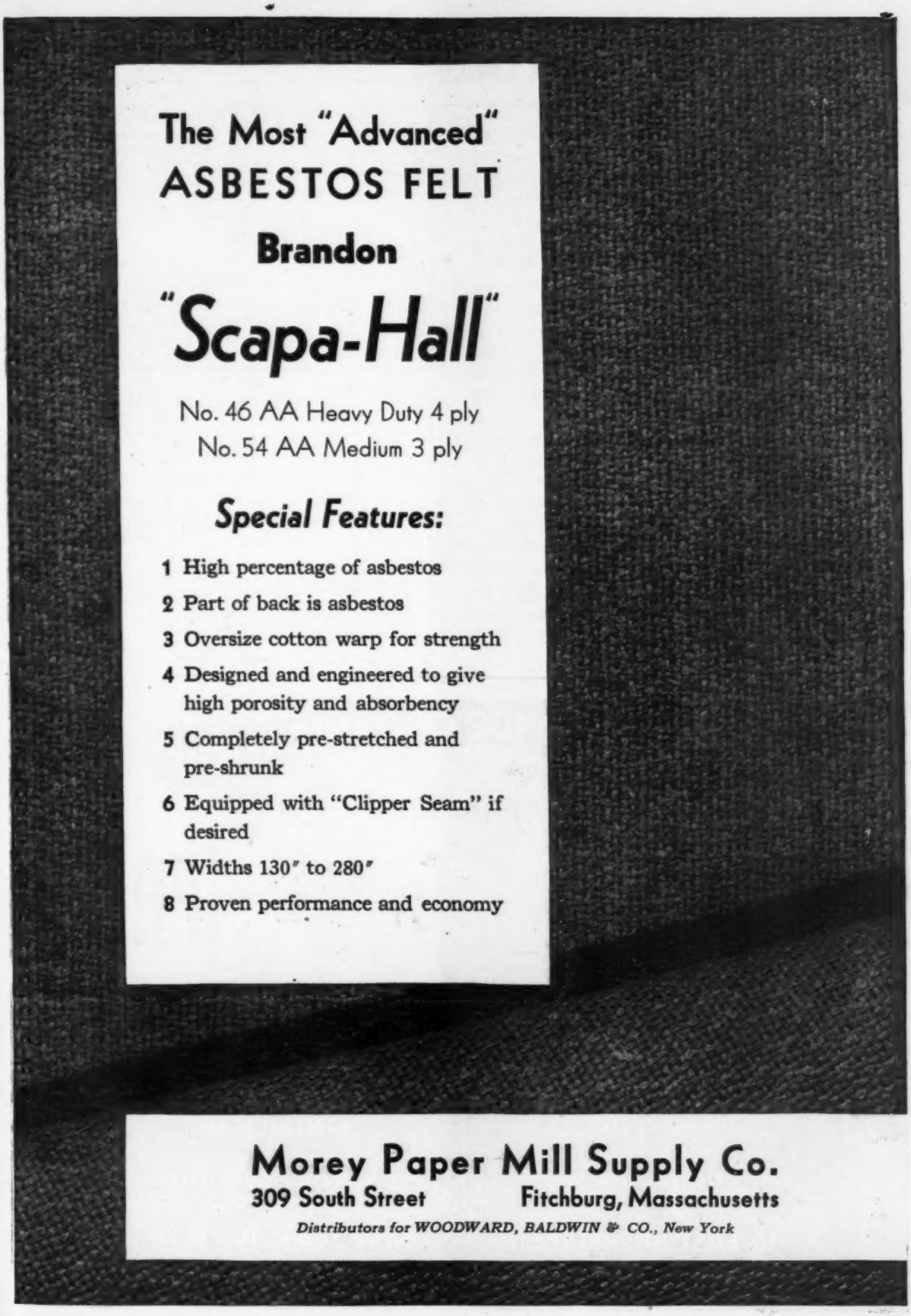
The Petenwell powerhouse is to be equipped with four 7,200-horsepower turbines connected to four 5,000-kilowatt generators, operating under a head of 42 feet.

The Castle Rock development is expected to follow completion of the Petenwell project, work on which was started late last summer and which is scheduled to be finished in July, 1949.

Although never formally announced by the Wisconsin Power Company, the Castle Rock development was referred to as a future undertaking when announcement of the beginning of work at Petenwell was made last August by George W. Mead, president of the company.

The Federal Power Commission's announcement stated that any protest against the approval of the Wisconsin River Power Company's application or request for hearing thereon should be submitted to the commission in Washington before December 29.

At Madison, George P. Steinmetz, chief engineer of the Public Service Commission, said the work now underway consisted of preliminary activities which did not interfere with navigation or other public rights.


The Most "Advanced"
ASBESTOS FELT
Brandon
"Scapa-Hall"
No. 46 AA Heavy Duty 4 ply
No. 54 AA Medium 3 ply
Special Features:
1 High percentage of asbestos
2 Part of back is asbestos
3 Oversize cotton warp for strength
4 Designed and engineered to give high porosity and absorbency
5 Completely pre-stretched and pre-shrunk
6 Equipped with "Clipper Seam" if desired
7 Widths 130" to 280"
8 Proven performance and economy
Morey Paper Mill Supply Co.
309 South Street Fitchburg, Massachusetts
Distributors for WOODWARD, BALDWIN & CO., New York

DIGESTED

Assuming that the total United States economy will continue at peak levels through 1948 . . . . . it may be estimated that both pulp and paper supplies will just about balance customer's needs during 1948. This estimate, however, assumes that there will be no material increase in exports of pulp, paper or paper products from the United States nor that there will be any substantial change in the relative volume of pulp and newsprint imports from Canada, Newfoundland, and Northern Europe. If pulp imports were materially reduced in 1948 from the estimated 1947 level of around 2.4 million tons, it would result in a serious curtailment in operations of United States paper mills depending in whole or in part upon purchased market pulp.

Newsprint is the only major item which is expected to continue in substantially short supply throughout 1948. It will be at least 1949 or 1950 before the new newsprint mill now under way at Childersburg, Ala., will be in production. New newsprint machines in Canada and Newfoundland may come into production somewhat earlier. The Alaskan prospectus may or may not result in a newsprint mill; if it does, it will be at least 1950 before output could be placed upon the market.—From DOMESTIC TRADE DIGEST, of the United States Department of Commerce.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1947		Corresponding Weeks—1946	
October 25	110.2	October 26	106.8
November 1	111.1	November 2	107.2
November 8	108.9	November 9	106.8
November 15	109.1	November 16	104.9
November 22 (revised)	111.9	November 23	106.6
November 29	*108.5*	November 30	103.0

COMPARATIVE MONTHLY SUMMARIES

1946		1947		1947		1946	
Jan.	94.7	July	94.0	Jan.	102.1	June	106.0
Feb.	98.4	Aug.	104.7	Feb.	105.9	July	93.5
Mar.	104.4	Sep.	101.3	Mar.	106.1	Aug.	104.2
Apr.	102.7	Oct.	106.4	Apr.	105.1	Sep.	102.0
May	100.7	Nov.	105.5	May	106.2	Oct.	109.5
June	104.6	Dec.	97.0			Nov.	*109.6*
		Year Avg.	101.1				

COMPARATIVE YEARLY SUMMARIES

	1940	1941	1942	1943	1944	1945	1946	1947
Year to Date	86.0	97.4	91.3	88.5	88.7	89.8	101.6	*104.6*
Year Average	85.6	97.4	90.4	87.8	88.1	89.4	101.1	

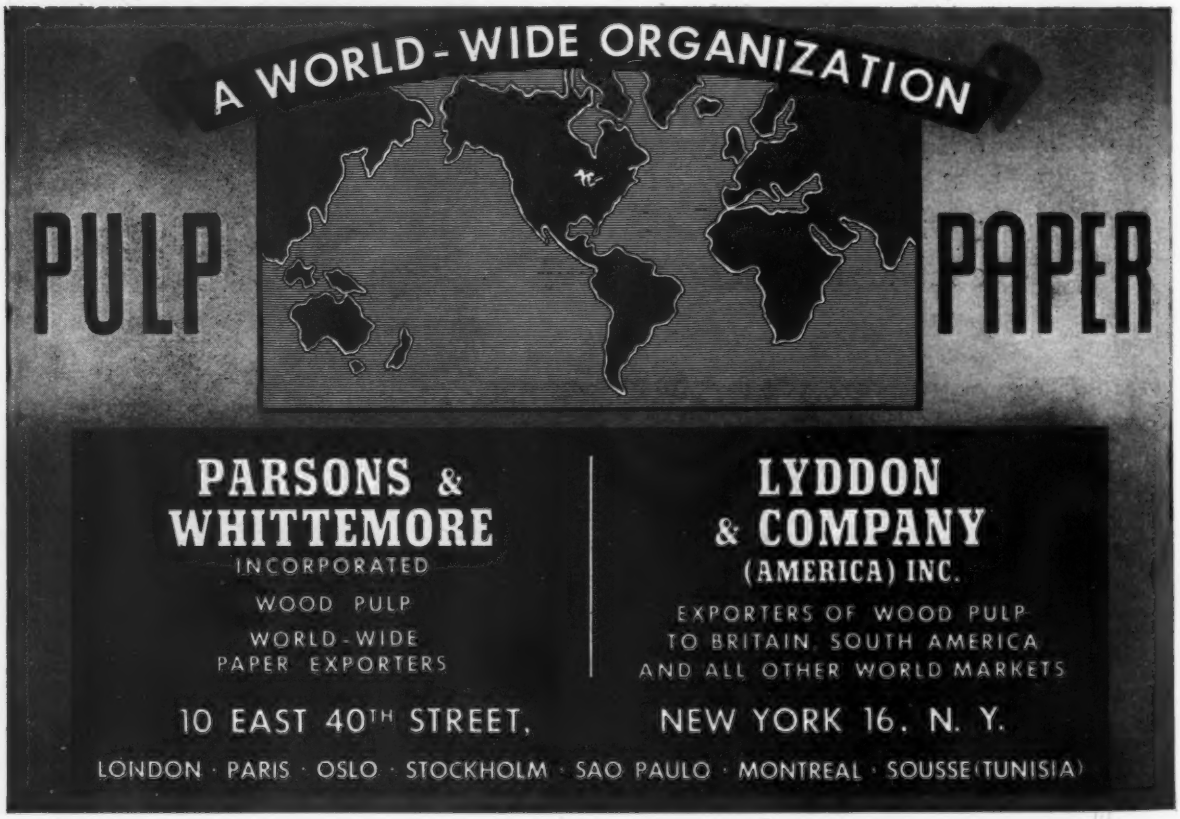
PAPERBOARD OPERATING RATIOS†

Current Weeks—1947		Corresponding Weeks—1946	
October 25	101	October 26	101
November 1	100	November 2	100
November 8	102	November 9	102
November 15	101	November 16	101
November 22	102	November 23	100
November 29	*100*	November 30	94

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1946	99	91	100	99	94	97	89	99	96	100	99	92	96
1947	99	103	101	100	101	101	90	99	96	101	99		

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.



EDITORIAL

Educational

Twin educational projects of more than passing interest to the paper industry appear to follow a trend of postwar industrial development that are arresting in their promise. On one side is the picture of industry and engineering being fostered in a series of localized universities in major cities. These are frankly to be set up so that young engineering graduates may continue, on the graduate level, their studies while they are gainfully employed in the industrial centers. On the other hand a movement fostered by the American Institute of Graphic Arts under which a school and college program is to be developed that will train and prepare students for careers in the graphic arts.

This program has been entrusted to the general supervision of Prof. Ray Nash of Dartmouth, and its first group to be formed has been authorized at the petition of some seventy students at the Carnegie Institute of Technology.

Professor Nash, who is printing advisor to Dartmouth College, and conducts courses in the graphic arts in the Department of Fine Art of Dartmouth is the author. Mr. Nash has also recently designed the new time-table of the Boston and Maine Railroad, Boston, Mass.

As Chairman of the AIGA's School and College Program Committee, Mr. Nash will investigate the needs and possibilities in schools, colleges and universities for graphic arts education throughout the United States. This program, when developed, will be applied through a system of AIGA chapters for professionals and employees of graphic arts industries which the American Institute of Graphic Arts is sponsoring throughout the United States. Under Mr. Nash's direction, student chapters will also be set up in the various schools and colleges to encourage interest in and understanding of the graphic arts to raise standards in the field and to develop sources of skilled personnel to enter the industry.

Of perhaps more direct interest to industry is an innovation in engineering education, a series of "universities" in key cities throughout the nation for graduate engineers, staffed by practicing members of the profession, to be sponsored by the Council of The American Society of Mechanical Engineers. The council held its annual business session preliminary to the society's five-day Annual Meeting opening tomorrow.

The pilot operation is already under way in Detroit, and several other cities are initiating similar programs.

The Engineers' Council for Professional Development, a national organization, is sponsor of the plan. Under its chairman, James W. Parker of Detroit, it will work in that city with the local engineering society and its affiliates, some thirty local sections of national technical societies. to give courses, lectures and consultations to engineer graduates. "Regents" of the new university will be past presidents of the society, and the faculty will be outstanding engineers in active duty in the area.

Transport Bottleneck

There can be little comfort in a state of affairs which, while it carries the implication that other industries are having equal troubles in meeting demands upon them puts the observer in the position of one who also is deeply concerned. To a group which has suffered among its other embarrassments a shortage of transportation facilities there is scant comfort in a recent survey of shortages in new freight car production.

The demand for freight cars according to the Department of Commerce, continues strong. Unfilled orders for freight cars on November 1, 1947, amounted to 125,623 domestic and 5,081 foreign cars. At the end of January 1947, the comparable figures were 75,578 domestic and 29,605 foreign cars.

Production of domestic cars which got off to a slow start in 1947, has shown a marked improvement in recent months the Department records. Since June, production of cars for United States railroads has shown an increase each month. During October, 8,364 cars were produced and the goal of 10,000 cars per month which the industry had hoped to achieve shortly after midyear, began to come within sight. During the first half of November, 4,398 cars were produced. The extent to which the rate achieved, can be continued or surpassed, will depend on receipt of adequate steel shipments the survey adds.

Chemistry Reaches Out

In the annual exposition of the chemical industries, just brought to a close in New York City, all industry has been impressed not only with the vast strides that have been made in turning the laboratory to everyday services but in the promise that yet more is to come. Industry has become research-minded.

According to one exhibitor, eight-seven per cent of American industry is spending more for research today than it did before the war, and seventy-two per cent anticipate an increase in research activities, of which fifteen per cent in point of time is dedicated to new products and processes in fields that are foreign to the organization's main efforts.

W. L. Cook

Editor

PROTECT WET LAPS IN STORAGE

Use Du Pont LIGNASAN-X

REG. U. S. PAT. OFF.

an improved bactericide and fungicide now water-soluble

Sprayed on laps at the wet machine, Du Pont "Lignasan"-X offers protection against deterioration from bacteria and fungi. "Lignasan"-X has also proved its effectiveness in preserving slush pulp in stock chests. It gives over-the-weekend protection—allows fast Monday morning starts.

In paper mills, "Lignasan"-X serves as an economical slime-control agent. It prevents the build-up of slime—keeps the system clean all the way to the dry cans—helps eliminate shut-downs.

Find out now how "Lignasan"-X can be of valuable service to you in your pulp or paper mill. Ask your Du Pont representative, or write direct.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DU PONT
REG. U. S. PAT. OFF.

E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware

SECTION OF THE

TECHNICAL ASSOCIATION
OF THE PULP AND PAPER INDUSTRY

122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

Treatment of Surface Water Supplies for Pulp and Paper Mills*

By R. R. Adams[1]

Abstract

The surface waters and the treatment thereof for pulp and paper mill operations in the Southeast are discussed. Because of the varying quality of water in various localities from the Blue Ridge Mountains to the rivers in the coastal regions of the Carolinas, and those in Georgia and Florida, it is necessary to vary the type of treatment to provide waters of suitable quality.

The successive stages used in the treatment of surface waters are divided as follows: (1) plain sedimentation, (2) sterilization, (3) chemical feeding, (4) chemical mixing, (5) flocculation, (6) sedimentation, (7) filtration, (8) pH correction, (9) clear water storage.

The proper treatment of a surface water supply, which is to be used in the manufacture of pulp and paper, is governed by a large number of factors depending both on the character of the supply and the mill requirements. Some few mills are fortunate in having surface supplies which require practically no treatment, but others may and do require a complete treatment of the supply for the production of a satisfactory product. The importance of having an adequate supply of water of suitable quality, however, is generally recognized, and this factor is paramount in selecting locations for new pulp and paper mills.

This subject of water treatment is very broad and has been covered extensively in literature during the past few years. Suggested standards of quality of water for various types of uses have been set up for the industry, and these standards have probably been of value to individual mills in judging the quality of their water supplies, and the need for improved quality of their supply.

One phase of the subject of water supply treatment which the author believes has not been covered in recent papers presented before TAPPI conventions, is the treatment of surface water supplies. Since the author has been associated with several new projects in the Southeast where the selection and treatment of the water supply was an important factor in the plant location, some observations in this connection may be of value to those who have an interest in this subject. His observations will be confined mostly to waters in the southeastern section of the country.

Raw Water Supply

Of course, the type and extent of treatment required will be governed a great deal by the quality and condition of the raw water supply. Rivers having their original in the mountainous areas of the Southeast are generally clear and have low turbidity during normal flow until they reach cultivated and developed areas where soil erosion begins. Some of the mills can use this clear water without treatment; however, for the higher grades of paper some form of treatment is usually provided. The water draining from the catchment area of the Blue Ridge Mountain is, as a rule, very soft and low in total solids except in areas where limestone formations occur. For instance, Pigeon River in western North Carolina, has a total hardness, according to an analysis made by the author's firm in 1935, of 3 p.p.m., total solids of 36 p.p.m, and suspended solids of 7 p.p.m. This type of water is usually corrosive and sometimes contains objectionable quantities of manganese and iron. Special provision must be made at times in the water treatment plant to remove these objectionable elements.

River waters in the Piedmont areas of the southeast are generally high in turbidities but have a relatively low dissolved solids content and upon clarification are low in color. Saluda River water with dissolved solids of 42 p.p.m., turbidity of 35 p.p.m. and color of 35, was reduced to zero turbidity and zero color by coagulation and filtration in the laboratory.

A one year average of analyses of the Savannah River water at Clyo, Georgia, by the U. S. Geological Survey, shows total solids 123 p.p.m., dissolved solids 41 p.p.m, total hardness 16 p.p.m., color 13, and suspended solids 82 p.p.m. Most of the raw river waters in the Piedmont area of the Southeast will produce a very good quality of water for almost any type of pulp and paper manufacture when coagulated and filtered in a modern treating plant provided the source is not unduly polluted with industrial wastes.

Rivers having their main drainage areas in the coastal plains of the Southeast are generally low in

* Presented at the Second Engineering Conference sponsored by the Technical Association of the Pulp and Paper Industry held at The Bellevue-Stratford, Philadelphia, Pa., Nov. 3-5, 1947.
[1] J. E. Sirrine Co., Greenville, S. C.

turbidities and high in color. Suwanee River in Florida shows 6 p.p.m. suspended solids and a color of 40. Ogeechee River near Savannah, Georgia, shows suspended solids of 6 p.p.m., dissolved solids 76 p.p.m., and a color of 28 p.p.m. (1938). These waters usually are on the acid side and as a rule are high in iron but generally are rather soft. Some of the rivers in the Southeast which drain from limestone areas are comparatively hard. An analysis of water from James River at Lynchburg, Virginia, in 1937, showed 135 p.p.m. total hardness. This type of river water is usually fed by springs from limestone formations. Lake waters do not provide a very prominent source of water supply for mills in the Southeast and will not be considered here although the treatment in general will follow the methods used for purification of river waters.

Water Treatment

The successive stages used in treatment of surface waters may be divided as follows: (1) plain sedimentation, (2) sterilization, (3) chemical feeding, (4) chemical mixing, (5) flocculation, (6) sedimentation, (7) filtration, (8) pH correction, and (9) clear water storage.

Each of these divisions of treatment are discussed, however, in a paper of this type the description must, necessarily, be sketchy.

Sedimentation

Plain sedimentation is sometimes used where very turbid waters are encountered and the topography permits a low cost storage reservoir to be installed. Also, this type of treatment is obtained from impounding reservoirs and lakes where these form a part of the water supply system. The storage will produce some clarification and, in addition, will probably accomplish some color removal by the bleaching action of the sun. On the other hand, storage over a considerable period may promote the growth of algae and some forms of plant life which will require remedial measures to provide a satisfactory effluent. In certain mountainous areas plain sedimentation may be the only treatment required except for pH correction and sterilization.

The cities of Asheville and Hendersonville, North Carolina, and Greenville, South Carolina, have supplies of this sort and the quality of the water is very good. There are certain periods of the year, however, when the lakes "turn over" at which times the effluent from the lakes contains a small amount of suspended matter. This suspended matter may be objectionable for washing high grade bleached pulp and paper products, and some additional treatment may be required to produce a satisfactory supply. It has been found, in some cases, that pressure filters on this type of water have solved difficulties in textile finishing plants where trouble from this source was encountered.

Sterilization

In recent years it has been found advantageous, at a number of plants, to sterilize by chlorination the raw water supply to the treatment plant before coagulation and sedimentation. Quite a number of articles have been written on this subject in the journals devoted to the waterworks industry, and for detailed procedure literature is obtainable from the manufacturers of chlorine feeding equipment.

The complete satisfaction of chlorine demand by the raw water, with certain limiting qualifications, is called "break-point" chlorination. In addition to killing the bacteria in the raw water, this type of chlorination also can be used to control the growth of algae, to aid coagulation, to oxidize manganese which is subsequently removed in the treatment process, and to reduce color by the bleaching action of this chlorine. The dosages required to accomplish "break-point" chlorination will vary widely depending on the character of the raw water. Unpolluted water with no ammonia, organic matter, hydrogen sulphide, or other reducing materials may require as little as 1 part per million or less, however, for highly polluted supplies the amount required may exceed 20 p.p.m. Average river water demands will probably be around 5 p.p.m. A number of tests have been developed to control the chlorination operation to obtain good results, and details of these tests are available from the manufacturers of chlorine feeding equipment.

Flocculation

The next treatment used in surface water purification plants is some form of coagulation with chemicals. Although ferrous or ferric salts are sometimes used as a coagulant, the one most generally used is alum which is supplied in both liquid and solid forms. For normal river conditions in the Piedmont areas in the Southeast, there is sufficient alkalinity in the water to produce a suitable "floc" with alum alone so that no alkali is generally needed for flocculation. However, when turbidities rise above normal it usually becomes necessary to add an alkali to combine with the larger quantities of alum required for proper flocculation. Lime, soda ash, and sometimes caustic soda are used as an alkali for this purpose. Lime adds some hardness to the water and for this reason is considered objectionable by some users of water receiving this treatment. At any one plant, there is usually a fair relation between turbidities and alum required for coagulation, and a chart can be prepared that will aid the operator in judging the proper dosage of alum as the river conditions change rapidly, especially during rainstorms.

With waters of low total solids and high turbidities, the pH for optimum flocculation becomes very critical, particularly if efficiency in chemical consumption is desired. For this reason, a pH recorder, and sometimes a pH controller, is installed to maintain accurately the best flocculation conditions. For waters of high alkalinities and total solids the pH for the best flocculation is not usually critical and accurate control is not so necessary. For plants operating at varying rates throughout the day it is desirable to have automatic proportioning of chemical feed to the raw water flow. This can be accomplished by controlling the rate of chemical feed from the raw water meter. This can also be accomplished by installing a pH transmitter to increase, or decrease, the alum feed as required to maintain a constant pH in the mixed water. This type control will regulate the chemical feed for both change in composition of the raw water and for change in rate of flow. However, this latter type control will probably be satisfactory only on waters which are critical to pH control and have low buffer values.

To give some idea of the quantities of alum used in flocculating turbid waters in the Southeast, it is good operation when a plant averages less than 1 grain per gallon of water treated. Turbidities of around 200 p.p.m. will probably require around 2 grains per gallon, and correspondingly higher as turbidities rise although the rate of increased alum

required drops off as the turbidity goes up. For instance, a turbidity of about 1000 p.p.m. will probably require less than 3 grains per gallon of alum. This applies only to turbidity removal. For highly colored waters with low turbidity, it is usually necessary to go to a comparatively low pH to secure a satisfactory "floc." It is generally found that more coagulant is required for removal of color from river waters than for the removal of a normal amount of turbidity. There are a number of coagulation agents, others than alum, which have special, and some fairly general, applications; however, alum is used most extensively. This alum, by the way, is the same as that used by papermakers, and a common storage system can be used when the water treating plant is close by the paper mill.

The equipment used for feeding chemicals will vary depending on the physical form of the chemicals applied. For powdered dry materials several types of dry feed machines are available. The most accurate type will feed the chemicals on a weight basis. However, for small plants and small chemical feeds a volumetric type has been widely used. On larger plants the saving in chemicals by controlling the feed accurately usually justifies the cost of the more accurate feed equipment. In pulp and paper mills where liquid alum is used it is usually convenient to use this same material for water coagulation, and some form of liquid feeder must be provided. An orifice feedbox has probably been most universally used for this purpose. However, this type feed has objections due to the orifice plugging and changing the rate of feed, and difficulty in proportioning the chemical flow to the raw water. A rotating bucket type feeder is available which feeds in proportion to the speed of rotation of the buckets. This can be adapted to proportional control from the raw water meter.

After adding the coagulant to the raw water, it is desirable to disperse this material rapidly throughout the mass of water before flocculation begins. Flash mixers of various types are used for this purpose in modern plants. It usually takes several minutes before a "floc" begins to form after the addition of the alum or other coagulant, and violent agitation during this period is not objectionable.

Several types of flash mixers are available, one of these is a motor driven impeller which is inserted in the pipe line and designed to produce maximum agitation without pumping action. The chemical is added to the eye of the impeller and dispersed at speeds up to 1750 r.p.m. A more conventional type of flash mixer is the motor driven turbine type of paddle which operates in a tank having a detention of from 1 to 3 minutes. Several of these can be operated in series or parellel; however, the author prefers single stage operation to prevent breaking up of the incipient "floc" in the latter stages. Where the capacity of the single stage is insufficient, parallel stages can be used.

After this flash mixing operation, it is necessary to prevent excessive agitation in conduits leading to the flocculating basins. Usually velocities are limited to 2 feet per second in these conduits.

The next succeeding operation in the conventional type of plant is the building up of a "floc" by a gentle stirring action which tends to agglomerate the suspended matter into coarse particles which will settle rapidly in the sedimentation basin. It is desirable to obtain a "floc" which will collect all fine suspended matter and colloidal particles and leave the water between clear and sparkling.

Two general types of flocculation equipment are used. One is based on using stationary baffles, either over-and-under or sidewise flow with the agitation being obtained by controlling the velocity and direction of flow through the baffle system. The other is to provide a stirring action by means of motor driven paddles or other mechanical devices. In the baffle system, the entrance velocities to the flocculating chamber may be as high as 1½ feet per second, however, this is sometimes gradually reduced so that at the outlet of the baffle system the velocity approximates ½ foot per second. The period of flocculation usually varies from 15 to 45 minutes; however, the character of the water to be treated will determine, to a considerable extent, the selection of velocities and periods of treatment. The economy in the use of chemicals for coagulating a specific water will usually govern the selection of these design features.

With mechanical flocculation equipment one of the principal items to consider is the avoidance of short circuiting of unflocculated water into the sedimentation basin. To avoid this short circuiting mechanical flocculation is sometimes carried out in several stages. One of the advantages of the mechanical flocculation over baffle flocculation is the small loss in head through the system. The baffle system is rigid and not subject to control with varying raw water conditions and rates of flow throughout the plant, whereas, the mechanical flocculator can be varied in speed to suit treating requirements. The mechanical flocculator takes several forms, one being a series of paddles attached to a horizontal shaft with flow across the axis of the paddles, whereas another type is the same with the flow parallel to the axis. Still another type has vertical shafts with suspended paddles on horizontal arms, this sometimes being called the "Sacramento" type. There is also on the market a propeller flocculator with vertical shaft and one or more impellers.

The power required for mechanical flocculation usually amounts to ¼ to ⅓ hp. per m.g.d. of plant flow. It is usual practice to limit the peripheral velocity of the paddles to approximately 1.5 feet per second although it is usually subject to speed control to obtain optimum flocculation and avoid break up of "floc." All types of flocculation chambers should be designed to avoid dead spaces in which the "floc" will settle out.

Sedimentation

After flocculation, the water enters the sedimentation basin, usually through some form of stilling device to distribute the flow across the width of the settling basin. There are several types of settling basins in use, probably the most prevalent being the rectangular concrete basin varying in depth from perhaps around 8 to 20 feet. The principal considerations in the design of the sedimentation basin is the period of retention, the inlet and outlet structures, and provision for the removal of sludge, either continuous or periodic. In rectangular basins it is desirable to have the flow of the incoming water spread out across the full width of the basin and maintained that way throughout its length.

The sedimentation basin provides for the removal of as much suspended matter as possible, and the storage of this sludge between intervals of cleaning. The cleaning intervals will vary depending on the turbidity of the raw water supply. Since the basin

must usually be drained in order to be cleaned it is desirable to provide sludge capacity in the basin for several months between cleanings to avoid excessive water usage for this purpose. If the sludge should become septic and begin to form gas during this storage period, the basin must be cleaned more often or steps taken to sterilize the sludge. Otherwise the sludge may rise and pass on to the filters. Adequate prechlorination will generally cure this trouble.

Drains are provided in the bottom of the sedimentation basin into which the sludge is washed when the basin is cleaned. There have been several types of mechanical sludge collectors developed although the accumulation of sludge is usually so slow that the investment for mechanical equipment is not warranted. However, on river waters with very high turbidities the economic features of this equipment should be investigated before abandoning mechanical sludge collection in the design of the plant.

In the author's opinion the design of the entrance openings, stilling devices, and the outlet structures to sedimentation basins should be given very careful attention in new plants in order to obtain the best results. These features have received considerable attention in the design of sedimentation basins in recent years and a variety of designs have been developed which have improved the operating characteristics of these basins.

Circular shaped basins are also used for sedimentation, particularly in plants using an accelerated type of treatment in which the raw water, mixed with chemicals, is agitated with previously formed sludge blanket to produce a rapid settling "floc." These have much less detention time than for the more conventional type of settling basin although the mechanical equipment required is increased. The design criteria for this type of basin is usually the rate of rise of the water over the area of the settling basin rather than the detention time. The detention period is of the order of 1 hour. In this type basin the sludge is generally drained off continuously.

The principal advantage claimed for the accelerated sludge blanket type treatment is the saving in space over the conventional method of flocculation and settling. Comparisons of capital costs of plants for the two types of treatment, however, have shown that, taking all costs into consideration, the difference is not material on large plants, but changing economical conditions may vary this comparison.

After chemical mixing, coagulating, flocculation and settling of river water, the turbidity of the water should be reduced to less than 5 p.p.m. and sometimes is down to less than 1 p.p.m. For some mill purposes the quality of water directly from the settling basin is suitable. About the only practical means, however, of determining whether the mill can produce a satisfactory product by using settled water only, in the author's opinion, is to make trial runs using only settled water. This is not always feasible particularly in considering the needs of a new mill where no treating plant or paper mill exists. Usually, however, for new plants, it is known before-hand what quality of water will be needed and the necessary treatment can be determined by making tests on the raw water available. In any event, it is the author's opinion that it is advisable when filters are omitted from the treatment plant to provide space in a plant layout for the addition of filters except for low grades of pulp and board production when it is certain that a high quality of water supply will never be needed.

Filtration

Where a high grade of water is required in the process, the settled water is filtered, usually in rapid sand filters, but sometimes in pressure filters. The subject of filters has been much written about and fully covered in many excellent papers and books on the subject. A brief description may, however, be in order.

The filtering material generally utilized in rapid sand filters is sand or crushed, graded anthracite coal in beds varying from about 24 to 30 inches in thickness. Sand of about 0.45 mm. effective size or anthracite of about 0.62 mm. are usually used although these sizes are varied in practice to suit local circumstances and the ideas of the designing engineer.

The rate of filtration through sand beds is sometimes limited by public health authorities to 2 g.p.m. per square foot of filter area when the water is used for drinking purposes; however, the tendency recently has been to increase this rate somewhat, particularly where adequate preparation of the water before filtration has been carried out. For paper mill process water only, there is no such limitation and rates of 2.5 to 3.0 g.p.m. per square foot are not unusual. An important consideration in this connection is to keep the filter beds uniform and clean at all times and not allow them to deteriorate through lack of maintenance and proper operation. Adequate volume of backwash water should be provided at a suitable head either from an elevated storage tank or by means of a pump taking suction from the clear well. Backwash rates should be controlled by filter bed expansion to get good washing and cleaning of the filter bed down to the gravel at each backwash. This method, using filter bed expansion, automatically takes care of the variation in backwashing efficiencies with changes in the water temperature. Wash water rates may be as much as 50% greater in summertime than in winter for the same bed expansion. Sand expansion indicators are available from filter equipment manufacturers.

Rate-of-flow controllers are required on the filter effluent lines for best results from the filtering operation.

pH Control

After filtration, the water is usually given an after treatment with lime, soda ash, or sodium hydroxide, to bring the pH to the desired point. Also means for postchlorination are usually installed and used, except where prechlorination is sufficient to carry a chlorine residual into the clear well. Many advances in chlorination practice, as it applies to water supplies including paper requirements, have been made in recent years and improvements in results have followed these developments. It has been found in many filtration plants that improved flocculation and settling have followed after prechlorination was started and this treatment has been adopted by some plants as standard practice.

No mention has been made in the foregoing of the use of several aids in water treatment, such as activated carbon for odor and taste control, activated silica as a coagulant aid, sodium aluminate and other coagulants, all of which have applications for treating certain types of waters. Extensive data on these and similar materials are available from the manufacturers and suppliers of these materials.

Savannah Water System

As an example of a recently designed surface water treatment plant, where the finished water is to be used for pulp and paper mill use, and for other purposes, the author will describe briefly the new Savannah Industrial and Domestic Water Supply System, which was designed under his supervision. The raw water supply for this plant is taken from Abercorn Creek at a point near its mouth on Savannah River. There is an average of about a 5-foot tide at this point and the ebb and flow brings Savannah River water up the creek and only a small amount of local Abercorn Creek water enters the pump house. The raw water pump house has five vertical, single stage, double suction, pumps, set in a dry pit, directly connected to vertical solid shaft 250 hp. motors. The total capacity of these pumps is approximately 40 m.g.d. The motors are placed above high water of record. A 48-inch steel discharge main approximately 40,000 feet long connects to the treatment plant located on Cherokee Hill near Port Wentworth, Georgia.

The filter plant at 2 g.p.m. per square foot of filter area has a capacity of 35 m.g.d., although one unfinished filter bed is installed which, when completed, will bring the filtering capacity to 40 m.g.d. The finished water is expected to be used by paper mills and industries along the Savannah River, and also by domestic consumers.

The treatment plant consists of a chemical building, flash mixers, flocculation chambers, settling basins, rapid sand filters, and clear well. Also provided is an after-treatment mixing chamber for postchlorination and pH correction. A 2.5 million gallon capacity covered finished water storage reservoir is included, also a pump room in the filter head house, with all necessary auxiliary equipment, laboratories, etc.

The laboratory is equipped to make complete chemical analyses of the water and also all the necessary biological tests for complete control of the quality of the plant effluent.

The treating plant has facilities to store carload lots of liquid alum in an elevated lead-lined steel tank, also car lots of 1-ton chlorine containers, lime or soda ash, together with automatic equipment for feeding these chemicals. A system of three flash mixers in parallel is provided, also mechanical flocculation, and rectangular concrete settling basin with a special design outlet structure to reduce short circuiting and insure uniform removal of water from the settled area of the basin. Prechlorination as well as postchlorination facilities are provided. A control and meter board is located in the filter head house where the plant operation can be observed and controlled. At this point is located a remote switch for starting and stopping the raw water pumps as required. Levels in the reservoir are recorded here with high and low alarms. The pH of the raw, mixed, and finished waters is recorded at this filter head house panel.

Chemical feeds are controlled from a raw water venturi meter in proportion to the raw water flow. An automatic pH control is also imposed on the alum feed to vary the proportion of alum being fed to maintain a constant pH regardless of the condition of the raw water. The quantity of alkali fed to the raw water is set manually but varies in proportion to the raw water flow rate. The finished water is delivered to industries at a minimum head at the pipe line of 50 feet.

The distribution system includes a steel reservoir, 110 feet diameter by 60 feet high, located on high ground adjacent the treatment plant and a 48-inch main connecting at Port Wentworth to a 42-inch main which parallels the river for about 5 miles above the city of Savannah.

The water from the new Savannah plant is expected to average in hardness from 10 to 20 p.p.m. as $CaCO_3$, with total solids of around 60 to 80 p.p.m. The color should be less than 10 p.p.pm., based on a number of analyses run on samples taken at the site of the raw water pumping station. This plant is now nearing completion and will be in operation early in 1948.

Control Charts in Factory Management

John Wiley & Sons have recently published "Control Facts in Factory Management" by William B. Rice (149 pp.).

Directed at the executive with top management responsibilities, this book should be required reading for executives with quality responsibilities in manufacturing, purchasing or sales. The theme is to show how the concepts and methods of statistical quality control can help build economical quality into a product. In interesting non-technical, common sense language the author aims to bridge the gap between the highly mathematical and the cook book types of literature. The philosophies of statistical quality control are well collected and presented in the language of the business man.

The concepts underlying the control chart as used in control of manufacturing processes and in inspection of products are explained and the details of charts for variables and attributes are illustrated by fifteen "case histories." These examples illustrate the utility and versatility of the methods and are complete with explanatory comment and detailed calculations. They also illustrate the author's point that "quality control" is practically synonymous with "profit control."

Here are powerful tools for control and inspection that are not well known in the paper industry. Particularly is this true of the methods of attributes. Translation from the language of the shop, in which the book is written, to the language of the paper industry, should not be difficult for one who has given thought to quality systems and is serious in seeking improved methods.

The experienced quality control engineer may note the omission of some of his pet topics but will find much that is stimulating. For the executive who is stimulated to further study, a more extensive bibliography would be helpful.

Detailed, critical reviews of this book appear in Journal of the American Statistical Association *42*, 482-486 (1947) and in Industrial Quality Control *4*, 30 (July 1947).

Note: This book has been reviewed by J. B. Strieby, Kimberly-Clark Corporation. Copies may be obtained through the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y. at $2.50 per copy.

Paper Mill Lubrication— Drier Bearing Circulation Systems*

By A. I. Sippola[1]

Abstract

The author discusses various phases of the development of drier-bearing circulation-oiling systems. Through the period of extending the use of such systems to more paper machines, improvements were made in machine design, circulation design principles, and lubricants. The lubrication improvements affected by these changes, and the reasons for them are discussed. Those factors which still remain to make this a difficult lubrication problem are noted. Since there are all types of systems in service today, it is necessary to realize the shortcomings of each in order to secure the optimum in results. These items are discussed in a general way to enable their application to the individual case.

The subject of drier bearing lubrication presents a variety of operating and design factors, and in view of the great remodeling and expansion programs now in effect or proposed in the paper industry, it seems that this topic is timely since most new paper machine drier sections, rebuilt drier sections, and those added to existing machines for greater drying capacity are being equipped with circulation oiling systems.

From older machines equipped with such systems to the modern machine, there is considerable variation in both bearing design and circulation system design.

For purposes of this discussion, the reasons for the use of circulation oiling; the operating conditions; present design trends; present oil development trends; problems presented by typical systems; and the results to be expected from the combination of improvements in machined design and lubricants toward achieving the ideal results are considered.

Reasons for Circulation-Type Oiling Systems

The original approach to the circulation method of lubricating paper machine drier bearings was the ring-, chain-, and collar-oiled bearings. In this type of bearing a small quantity of oil is continuously fed to the journal by the ring, chain, or collar which dips in an oil supply contained in a reservoir below the bearing. After flowing through the bearing, the oil drips back to the oil sump and is ready for reuse. Here there is a comparatively small volume of oil subjected to quite rapid recycling, and continuously exposed to the high temperatures typical of such installations and the ever present factor of contamination with paper fly. Thus, the oil is subjected to severe oxidizing influences tending to create deposits. These can develop to a point where the ring, chain, or collar will cease to carry sufficient oil to the bearing resulting in excessive wear and eventual failure. It may promote deposits in the bearing side chamfers which can act as an oil "wipe" to starve the bearing of lubricant and again cause premature failure.

In order to minimize the severe oil oxidizing influences in this type bearing, steps were taken to continually remove the oil from the heat zone. This made it possible to cool the oil, remove insoluble contaminants, and further cleanse it prior to reintroducing it to the bearing. With this arrangement the returning oil was introduced at the top of the journal, the oil sump level was maintained by an overflow through which the excess oil was removed, and the rings, chains, or collars remained to function as before. The service conditions with this arrangement were not as severe as with the conventional ring, chain, or collar oiled bearing, but still it was impossible to completely renew the oil within the sump on each cycle. Thus, there still remained the problem of subjecting part of the oil to rather lengthy periods of exposure to high temperatures.

By providing a more rapid rate of oil feed to each bearing more oil was supplied by the circulation system than by the ring, chain, or collar. This made it feasible to remove these devices and thus to eliminate the so-called wet sump which was the major problem. The oil could then be drained from the bottom of the housing eliminating the overflow principle. This is known as a dry sump bearing.

Along with this development, it became necessary to provide adequate bearing seals which had previously received little consideration. Many bearings had openings around the journal approximating one-quarter of an inch through which a large quantity of oil could leak. Along with the problem of reducing oil leakage to the drier heads, felts, and probably the sheet, was that of preventing the entrance of foreign contamination. As the rate of oil feed was increased a definite need for seals developed. This requirement has been met, and the plain sleeve bearing of today is provided with very effective seals.

In the case of antifriction bearings which are finding wider application on paper machine driers the same development has taken place. Wet sumps have been practically eliminated on new designs, and rates of oil feed have been increased.

Much of the improvement in drier-bearing lubrication was necessitated by increased machine speeds and drier steam pressures.

There are many units in operation today lubricated by bottle and wick-feed oilers. Some utilize block grease when oily drier heads cause felt deterioration or make a narrower trim necessary due to oil. This is common to old-type plain bearings which are not equipped to prevent oil leakage.

By the use of circulation-type oiling systems, the bearings are lubricated by the flood principle rather than by the boundary principle which results from the use of bottle and wick-feed oilers and block grease. Today's paper machine plain-sleeve bearing, when lubricated by a circulation system, begins to approach the steam turbine bearing which closely approaches the ideal. During operation turbine bearings are completely separated from the shaft by a fluid

* Presented at the Second Engineering Conference sponsored by the Technical Association of the Pulp and Paper Industry held at The Bellevue-Stratford, Philadelphia, Pa., Nov. 3-5, 1947.

[1] Staff Engineer, Lubricating Department, Socony-Vacuum Oil Co., Inc., New York, N. Y.

film of oil which prevents actual metal-to-metal contact.

Operating Conditions Presented

Design trends and oil formulation have been such that the oil deterioration has been minimized. Nevertheless conditions still prevail that constitute a potential threat to correct lubrication.

To better appreciate the effect that these conditions may have on drier lubrication, each item is briefly discussed.

Heat

Steam, at pressures varying from a pound or two to perhaps over 100 p.s.i. gage depending on the type machine and grade of paper being run off, is introduced to the drier through a hollow journal. A steam seal is utilized to prevent leakage, and condensate is evacuated from the drier by means of a syphon pipe which is also fitted to the steam joint, (steam seal). The drier face temperature will vary from 175 to possibly 300°F. This means that the operating temperature within the bearing housing is quite high, and that an oil oxidating influence is ever-present.

Paper Fly

In the drying of paper, small cellulose fibers fly from the sheet, creating a dust that tends to enter the bearings and housings and contaminates the oil. The degree of this contamination varies with the grade of paper being made and the operating speed. No doubt the final formation of the fibers affects this as well, but suffice to say, paper fly is present. The slitting of the paper at the machine winders is also a great contributing factor, again dependent on the grade of paper being made.

Just how does this enter into the problem of drier bearing lubrication? The fibers that enter a bearing are picked up by the oil. They may or may not be carried to the oil reclamation equipment where they can be removed. If all the fibers were carried out of the bearing by the oil, there would be little to concern the operator. However, a portion of these fibers adhere to the oil wet surfaces and begin to accumulate. Some oil likewise is held causing it to remain in the hot zone. Oxidation will take place and eventually a mass of hard deposit is formed consisting of a combination of all the materials present. As these deposits accumulate they may eventually enter the bearing and cause wear. They can also build up at the oil drain hole and cause a restriction which will prevent the oil from draining properly. This causes oil overflow along the journal to the drier head and possibly to the felt or sheet. In addition, this loss of oil constitutes an unnecessary waste. When oil is found flowing along the journal to the drier head the natural tendency is to reduce the oil feed to the bearing. This will result in higher operating temperatures and may even result an insufficient oil supply to the bearing.

Moisture

Contamination of the system with water may result from a leaky oil cooler or from careless use of the water hose when washing down. It may also occur as a result of the condensation in the bearing housing of water vapor contained in highly humid air or of steam from faulty steam joints. The potential of water contamination is, therefore, present from several sources.

Moisture in the form of vapor will condense to form water whenever its temperature is lowered below the dew point. This can occur when the machine is shut down or at parts of the system which are cool. Rusting occurs on parts unexposed to oil. This introduces another contaminant which is abrasive and is also a catylist promoting oil oxidation. It is not unusual to find rusting of parts which are continually covered by oil. This is particularly prevalent where very humid conditions exist. The use of specially rust inhibited oils is necessary to combat such action plus special design features to limit or minimize a "breathing" action which draws the air into the oil circulation system.

Contamination During Machine Erection

When a new paper machine is erected it is difficult to imagine an assembled unit without the presence of some contaminants within the oil circulation system. These may be either soluble or insoluble in the lubricating oil. The soluble materials may change the characteristics of the oil. The insolubles may be abrasive and lodge on bearing surfaces causing excessive wear or possible failure.

During erection, care is exercised to assure clean pipe, fittings, bearings, bearing housings, etc. However, it is impossible to assure complete cleanliness. All oil pipe for example should be pickled and cleaned to assure freedom of mill scale. Even with such precautions some mill scale and actual pipe shavings which resulted from threading operations have been found. Where pipe is welded "on the job," welding beads have been found. When threaded joints are used, excessive amounts of threading compound finds its way into the system. These hard particles are abrasive.

Thus far a few of the insoluble contaminants have been mentioned. What about the soluble type?

Many internal parts are protected with rust preventives which are not removed prior to installation. These are usually soluble in lubricating oil and are, therefore, considered as soluble contaminants. There are special type rust preventives which have no deleterious effect on the oil, but since the parts so protected may originate from one of many suppliers, one has no assurance that they may not affect the oil in a harmful manner.

All this means that the circulation system must be properly flushed out prior to operating the machine. There are accepted procedures for such flushing operations, but it is not within the scope of this discussion to go into this detail.

Present Machine Design Trends

It was noted earlier that there has been a trend on the part of designers to utilize a dry-sump bearing housing rather than to rely on an auxiliary means of lubrication which would necessitate maintaining a supply of oil in the housing. This has indeed improved the possibility of maintaining deposit-free bearings. What happens if the flow of oil should cease due to pump or motor failure?

Protection against this contingency is provided by installing a wick feed oiler in the oil supply line just ahead of the bearing. When normal oil flow is maintained, it overflows the wick oiler reservoir to the bearing. When flow ceases, there is some twelve to twenty ounces of oil in the wick oiler which will feed at a rate sufficient to lubricate the bearing for a number of hours.

With improved seals, it has been possible to increase the rate of oil flow to the bearings without the

danger of oil leakage along the journal. There are two principal advantages in such an increase in oil flow:

1. Temperature at which the oil leaves the bearing is reduced, thus decreasing the severity of the oxidizing influences.

2. The high rate of oil flow provides an improved mechanical washing or flushing effect to keep the bearing housing clean and free of contaminants.

With increased rates of oil flow to the bearings it has been necessary to enlarge the capacities of the oil tanks and filters. It is not uncommon to have paper machine drier bearing circulation systems of 5000 to 8000 gallon oil capacities. The capacity is based on the number of oil outlets and rate of oil feed and should provide sufficient oil to limit recirculation to once in 1 to 2 hours. This means that the resting time for the oil in the presettling and filter tanks will be from 1 to 2 hours. This is desirable to permit water and insoluble contaminants to settle out. The rate of settling will of course, be improved if the tanks are arranged so as to minimize turbulence.

In considering the design of a system such as this the builder takes into account the size of oil feed and return lines to assure adequate flow to and from the machine. In addition, electrical warning signals are provided. These are generally operated by mechanical floats in the various tanks. In addition, low-pressure signals are incorporated which are operated from mercoid switches built integral with the oil pressure gages. It is possible to make these operate over a range of pressures.

The builder anticipates the possiblity of high humidity, steam or other moisture contamination in designing a system. There are two basic methods used to combat moisture.

1. Proper venting of all trapped areas. For the oil tanks, a centrifugal exhaust blower is often connected to the tank covers. This type unit expels moisture vapors before they can condense on the exposed tank parts.

2. Introduction of cool air (preferably outside air) to the circulation system in a volume sufficient to maintain a pressure of 1 to 2 inches of water within the system. This will continually expel air from the system and prevent entrance of moisture laden air which surrounds an operating paper machine.

Trends in Circulating Oils

As circulation oiling systems became popular for paper-machine drier bearings, operators began to encounter problems and all was not as perfect as originally anticipated. These problems largely centered around the build-up of deposits which caused oil line stoppages and serious oil leaks. They also included deposit formations within bearing housings which seemingly could be removed only by physical cleaning. Most of this serious trouble developed on old machines which had been provided with some means of circulation oiling without too much thought to the lubrication factors involved.

The circulating oil used was not always the most stable product available which meant that here again was reason to expect accelerated deposit formations. The best oil obtainable for this service was thought to be a straight mineral, highly-paraffinic oil possessing a high viscosity index; in short, one with high chemical stability, ability to separate readily from water, and a maximum resistance toward viscosity change. While years ago these oils were considered good the use of inhibitors has now made possible products possessing superior qualities.

As improvements were made in machine design elements, and conditions promoting oil deterioration were minimized, it became apparent that the useful life of an oil could accordingly be increased. In general, this resulted in over-extending the use of the oil, and again, in combination with severe operating conditions, oil oxidation occurred and deposits were encountered.

In some instances, operators made a practice of draining, flushing, and cleaning drier-bearing circulation systems at intervals frequent enough to minimize oil deterioration and prevent deposit build-up. In sections of the country where high humidity conditions prevail this had an adverse effect on the ultimate results. While the oil itself was always in excellent condition, and thus the formation of deposits caused by oil oxidation were minimized, there was little in the oil to resist a tendency toward rusting which occurred even on those surfaces that were oil-wet. Thus, by improving one condition, another, which could be very serious, was created. It then became necessary to provide a lubricating oil which would have high resistance to the severe oxidizing influences of such a system and at the same time minimize the tendency toward rusting. This problem was particularly serious when antifriction drier bearings were in service.

In a sense, this problem was similar to that experienced with steam turbines. For the turbine service, lighter-bodied oils were developed, which contained various added materials that provided antioxidation and antirust characteristics. With the greater use of circulation systems for paper-machine drier bearings and the problems that developed it became apparent that oils similar to those developed for turbine service, but of higher viscosities, were needed for circulation and hydraulic systems.

The oils that are now offered for paper-machine drier-bearing circulation systems possess very high chemical stability and minimize the conditions of rusting which had prevailed in the areas of high humidity. One of the problems encountered in the formation of this type of oil was that of maintaining the ability of the oil to readily separate from water that entered the system. While the new type of oil will not separate from water quite as readily as the former straight mineral oils when new, they will retain this separating ability for much longer periods. The use of proper inhibitors minimizes the formation of those products which cause oils to form emulsions.

Problems Presented by Typical Circulation Systems

Basically, there are two types of drier circulation systems which should be considered in discussing the problems presented.

One type is comprised of the old machines which have later been equipped with circulation systems and those old machines which were equipped with circulation systems when installed.

The other type refers to the machine of today which has generally incorporated in its design and manufacture those improvements which were discussed earlier.

Old-Type Circulation Systems

Generally speaking, the capacity of these old-type systems is such that even with restricted oil feeds to each individual point of application the recycling time of the entire batch of oil is considerably less than that desired. Many machines have the oil piping so arranged that it passes through a series of two or more bearings before being returned to the oil storage tank. This means that the oil is first introduced to a top drier bearing from where it either drains or overflows directly to a bottom drier bearing. If three banks of driers are employed this oil would then be used in three drier bearings. By so doing, the oil temperature is elevated in the first bearing, introduced to the next bearing at this elevated temperature, and then either returned to storage or to a third drier where its temperature is further inceased. It can readily be seen that the oil is subjected to very severe oxidizing influences because of its progressive increase in temperature. In addition to the oxidizing influence of high temperature, the second and third bearing in the series is dependent upon oil leaving the first bearing for its lubrication. If the drain line from the first bearing becomes plugged, the second and third bearings are then starved of oil. Where there is this type of system, it is usually found that the rate of oil feed is comparatively low. Here again the purpose of rapid travel of the oil through the bearing which in itself would provide lower oil temperatures is defeated. Some systems of this type, because of the problems encountered, have since been rebuilt so that each individual bearing is supplied with oil directly from the main oil-supply header.

Often the oil return lines from the bearings are too small and do not allow rapid enough return by gravity to permit the desired amount of oil feed to the journal. In line with this, some systems are so erected that the sight-feed oil regulators are placed from four to ten feet ahead of the bearings. The oil fed by pressure through the sight-feed-oiler needle valve flows by gravity from the oiler to the bearing. When this piping is too small in diameter the desired amount of oil cannot be supplied to the bearing because of the limitation of gravity flow. Sometimes, in order to supply sufficient oil even its viscosity may have to be reduced below that desired and since the feeds must be restricted, bearing wear may be accelerated.

The oil piping of many machines in operation today have goosenecks or traps where insoluble materials may settle out and cause line plugging. If such traps are located in the feed line of a bearing, the oil is subjected to elevated temperatures for a considerable period of time. This again promotes oil oxidation.

On practically all older type systems the overhead gravity oil-flow tank has been utilized. The main objection to such a method is that a comparatively low pressure is realized at the needle valves of the sight-feed oilers. Any contamination which may have been carried through with the oil to this point will then have a greater tendency to cause plugging at the valves and decrease or stop the oil flow to the bearing.

As mentioned earlier, most older machines are not equipped with bearing seals. There is the two-fold possibility of oil leakage to the drier heads and the entrance of any contamination present in the surrounding area. If oil leakage is a problem it is apparent that the rate of oil feed must be reduced, the oil temperatures will increase, and the mechanical flushing action which should rid the bearing housing of foreign contamination will be reduced.

It was mentioned earlier that the oil capacity on old-type systems was comparatively small, and that the recycling time was short. This means that the time permitted for the oil to remain in the settling compartment would be quite short and in all prob ability there would be insufficient time permitted to drop out water and insoluble contaminants. Some of these systems are not adequately equipped with full-flow filters, and the contaminants are recirculated through the bearings. Even though a bypass filter may be connected to such a system the above possibility still remains.

Many oil settling or storage tanks are equipped with steam coils for heating the oil. This may be done to lower the oil viscosity for easier filtration, to obtain more rapid separation of insoluble contamination, or to provide a low enough oil viscosity to be properly handled in the delivery system to the bearings. Often proper control of these heating coils is not exercised, with the result that the oil surrounding the coils, which may have a temperature of 240° F., is oxidized or actually stewed down. Where steam coils are employed today, thermostatic controls regulate the steam flow so that the oil surrounding the coils is not continuously subjected to high local temperatures.

Present Day Circulation Systems

While some of the more prominent disadvantages of the old-type paper-machine drier-bearing circulation system have been discussed, perhaps some of the things that have been incorporated in the new designs to eliminate these problems should be considered.

There are systems today which hold from 5,000 to 8,000 gallons of oil. This is necessary because each individual point of oil application receives its supply from the main header. Moreover, the number of points of application has been greatly increased, and thus the rate of oil flow is much higher. The system is generally based on sufficient capacity to permit a recycling time of from 1 to 2 hours. The opportunity for settling is, therefore, increased. This in turn relieves the load on the filters regardless of type and permits longer operation between cleaning or renewals. The sight-feed oilers are generally located very close to the point of application, whether it be a bearing or a drier gear. When it becomes necessarp to set the oiler several feet from the point of application, the delivery line is of sufficient size to permit the proper oil flow by gravity to the point of application.

The bearings are generally of the dry-sump type. The returns provided from the bearing housings and the gear cases, if the latter are involved, are of ample size to drain off a large quantity of oil without backing up and leaking through the housing seals.

Felt seals have been used on bearing housings until very recently. Because they lose their resilience and have to be renewed if the bearing housing is taken apart, the builders are now providing quite effective housing seals that depend on a close fit between the journal and housing with serrated sections, multiple grooves, and sometimes oil flingers.

With the present-day design of bearings, housings, and circulation system, along with the improved lubricating oils, it would seem that no trouble is to be anticipated. The oil itself, after years of service, may

be in excellent condition as regards its physical characteristics, determined by laboratory analysis. However, this does not mean that the system itself is free of contamination or rust. In order to know the actual condition it is necessary to periodically inspect several bearings selected at random, and to inspect the gears if they are included as a part of this system. In addition, it is well to know whether or not deposits have collected in the return lines, and this can only be determined by breaking several joints and making an inspection.

Conclusion

These remarks have been based on general conditions affecting the lubrication of paper-machine drier bearings through circulation oiling. Realizing from field experience that many of the apparent basic facts are overlooked, those things which have a definite effect on the success of such an operation, and the reasons for them have, been discussed. Sometimes circulation troubles are not discovered until mechanical failure takes place. The purpose, therefore, of pointing out those things that should be guarded against, and those designed factors which may contribute to trouble, is to prevent serious mechanical trouble before it occurs. The chemistry of petroleum which is highly specialized, the matter of flushing out deposits which may exist in old machines, or contamination which may be present in a newly-erected machine has not been considered.

The lubricating oil supplier is in a position to study each individual case, and amplify upon the accepted procedures prevailing to suit the problem at hand.

Treatment for Prevention of Decay in Stacked Straw*

By B. Franklin Stahl[1] And Hillard L. Smith[2]

Abstract

Losses of stacked straw due to rot and decay are caused by microorganisms of the mold, yeast, and certain fungus types. Sodium pentachlorphenate has been found to be effective as a preservative and such treatment is thought to be economically sound.

Results of experiments are given.

Straw is purchased annually from the growers of cereal grains for the purpose of manufacturing a paperboard which is almost completely absorbed by the corrugated container industry. As straw is a seasonal crop it is purchased and stored when available, usually during the summer and early fall months. In order to maintain a sufficient supply on hand for the continuous conversion of straw into paper the year around it is necessary to store the crop, usually in open yards. A mill manufacturing in the neighborhood of 100 tons daily will require the straw from 200 to 250 acres daily. Such a large quantity requires a large area of storage space as insurance regulations limit the size of each stack and also limit the proximity of one stack to another so as to prevent a stack which might catch fire from falling against another stack.

Such stacks are normally built about twenty bales high (30 feet) and cover an area such that about 400 tons can be contained. Some mills build them 30 by 100 feet and others cover 50 by 65 feet.

The stacks remain exposed to the weather for periods of from 2 months to 2 years depending on the availability of straw and the needs of the mill. During extended periods of weathering the mills lose a considerable amount of valuable straw due to rotting, most of them finding an almost complete loss of the top three tiers of bales after a year of precipitation. These top three tiers represent about 15% of the stacked capacity of any yard and it is not difficult to understand the economics of such losses.

The extent of the loss is primarily due to several factors: warm weather and moist straw is the most favorable conditions for promoting growth of the organisms that produce decay. The exposed bales are naturally more receptive to the above conditions than the bales that are more or less protected deep within the stack. Other factors are: length of storage period, amount of precipitation, tightness of the bales, length of the straw, and the amount of precipitation that falls on these bales while they are being stacked.

The losses of decay are due to organisms belonging to the plant kingdom most of which represent the molds, yeasts, and certain higher fungi. Some gelatinous types of slimes form within the bales and are due to capsulated bacteria of the genera *Aerobacter, Micrococcus, Actinomyces,* etc., while the filamentous fungi of the mold types include members of the genera *Aspergillus, Trichoderma, Fusarium, Botrytis,* etc. These forms become a tangled mass of tough accumulations which in turn trap bacteria as well as minute spiders, fleas, and other members of the animal kingdom. Pseudoyeasts and yeastlike fungi of the genera *Torula, Oidium, Monilia,* etc. also form tough and rubbery deposits and live in perfect environment within the confines of the bales.

Early Experimental Work

During the summer of 1943 the chemists employed at the Terre Haute Paper Company decided to make some trial tests on weathering of straw after application of sodium pentachlorphenate. A small stack was decided on, to contain 100 bales of good wheat straw, firmly baled and of bright color. The bales were dipped in a tank containing a solution of 0.5% sodium pentachlorphenate and water and were allowed to remain in the solution until they had absorbed enough liquid to sink. It was the found that they had taken up the equivalent of 13 pounds of chemical per air-dry ton of straw. The stack was built 5 bales by 5 bales in area on cinder ground and 4 bales high.

* Presented at the meeting of the TAPPI Fibrous Agricultural Residues Committee at the Alton Box Board Co., Alton, Ill., October 23-24, 1947.

[1] Member TAPPI; Chief Chemist, Terre Haute Paper Co., Terre Haute, Ind.

[2] Dowicide Division, Dow Chemical Company, Midland, Mich.

After two winters and summers of storage the stack was still in excellent condition whereas untreated straw in another stack had decomposed badly. The above-mentioned stack stood for probably 22 months and received a precipitation of about 75 inches of snow and rainfall. Repeated wetting and drying failed to allow growth of the air-borne microorganisms which normally cause decay. In the baling of straw there is normally retained some grain which has been missed by the methods of harvesting the crop. This grain usually sprouts within the bales and produces a verdant growth of grass from the sides and top of the exposed bales. None of this growth was evident in the experimental stack under consideration showing that the chemical treatment killed the germ of the wheat. This is mentioned only incidentally and has nothing to do with the normal problems.

Advanced Experimental Work

In trying to determine the value of the straw lost through decay it was found that it might pay the company to invest as much as $200 worth of chemical to be applied to each of the 400-ton stacks. Further experimental work was needed, however, and it was decided that several more small stacks would be erected with applications of sodium pentachlorphenate to the amounts of $100 and $200 per large stack. Areas of these large stacks were measured and small stacks were built to conform to the exposed areas of large stacks. A figure was set for treatment of the top layer only. In other words, on a commercial scale of application all $200 worth of compound would be applied to the top tier with the idea that rain would promote treatment down inside the stack by means of seepage.

On April 1, 1946 three small stacks were built of good quality dry wheat straw to simulate the area covered by the larger 400-ton stacks. These small stacks were 9 bales long, 8 bales wide, and 6 bales deep. The top bales of the first stack were treated with 150 pounds of sodium pentachlorphenate per 496 square feet or 1 pound per 3.3 square feet of surface area, which is equivalent to a cost of about $182 per 400-ton stack. The second stack was treated on top with 69 pounds of preservative, or 1 pound per 6.8 square feet, with a chemical cost of about $84 per 400-ton stack. The third stack was left untreated for purposes of control measurement. No rain fell on these stacks until after dusting with the compound which had been spread as evenly as possible.

The first thorough inspection was made on the following September 9th, with the following observations: Stack No. 1 was all firm and bright on top and inside. No green foliage was apparent but an occasional mold spot was noted. Stack No. 2 was very similar to the above. The mold spots were more evident but the difference in cost of treatment was not thought to be worthwhile, the extra cost being about $100 per large stack. On stack No. 3 there was evidence of decomposition having started, the top tier of bales being loose with noticeable amounts of green foliage and very numerous spots of mold growths. A person walking atop the stack sank halfway to his knees. The precipitation from the date of erecting these three stacks was 24.37 inches, or more than half of the average annual amount. Soon after the above inspection, Stack No. 1 (the $182 treatment) was torn down and used in the mill with no apparent difference in handling or cooking qualities. Small ricks No. 2 and No. 3 were left standing for 1 year and observed several times before being torn down the first of April, 1947. The first and second tiers of the control rick (No. 3) were considered practically 100% loss due to rotting. There was some rotting of the straw in the third tier. The top tier of bales in rick No. 2 showed some molding on the top of the bale. She second and third tiers were in excellent condtion.

At this point it was thought that several large stacks in the yard ought to be treated to determine the handling qualities of straw that has aged in the yard through a fall and winter season. These large stacks would give more reliable evidence from the standpoint of the yard workers who tear down such stacks year after year.

It was, therefore, decided that sufficient sodium pentachlorphenate be purchased to treat five stacks of 400 tons each. These stacks are normally 20 bales high and cover an area of about 30 by 100 feet. Equipment was borrowed for this treatment so that the compound could be applied in solution. It was necessary to have a tank of sufficient capacity to wet the entire top tier of bales thoroughly. In this case 450 gallons of water were used to dissolves 550 pounds of compound at a cost of $93.50 per stack. The tank was mounted on the bed of a truck and hauled to the base of the stacks. A pump that was available had capacity for delivering a good stream of liquor at the 30 feet elevation and a 1½-inch fire hose was used with an ordinary fire nozzle. A spray nozzle was tried at first but the mist aggravated the man making the application. Rubber clothing covered all but his face which was semiprotected by a plastic eye-shield.

At the above dilution ratio the fungicide seemed to go into solution readily by recirculation through the tank. Actual application required about 45 minutes but the time lost in getting the compound into the tank and dissolving it showed that a large scale commercial application each year would require more suitable and adaptable equipment.

It was unfortunate that these stacks could not be treated until mid-October, 1946 because they had all been built between July 30th and August 21st and received precipitation ranging from 1.42 to 6.87-inches prior to treatment. The top tiers had thus started some amount of decay but were still solid when treatment was completed.

After 6 months (October to April) the large stacks were inspected. The treated straw appeared to be well preserved and there was no growth of foliage atop the stacks. Almost every untreated stack in the yard was, at this time, bright green with a good crop of wheat growing. During the spring months the mill normally tops all of its stacks to prevent absolute decay and loss of the top three tiers. These five treated stacks were not topped until after all other stacks had been broken and the state of preservation was exceedingly good.

Corrosion

All bales exposed to treatement during the above tests were baled with black iron baling wire, about No. 15 gage. No galvanized and very little aluminum wire were available during the year. Corrosion appeared to be somewhat excessive in the treated stacks although the mill normally loses a small percentage of black iron wire after 1 year of yard storage. It was evident that galvanized wire would resist such corrosion and samples of different wires were tested

in water solutions of various concentrations with the results tabulated below.

Concentration of Fungicide, % of Weight	Wire	Days	% Loss
5	Aluminum	13	0.58
5	Aluminum	34	0.91
10	Aluminum	13	1.09
10	Aluminum	34	2.53
20	Aluminum	21	2.76
5	Iron	13	0.00
5	Iron	34	0.06
10	Iron	13	0.01
10	Iron	34	0.11
20	Iron	21	0.06
5	Galvanized iron	13	0.00
5	Galvanized iron	34	0.04
10	Galvanized iron	13	0.00
10	Galvanized iron	34	0.02
20	Galvanized iron	21	0.02

Economics of the Problem

It is rather difficult to estimate the actual losses of straw in dollars. The present cost of wheat straw, delivered to the mills, is about $16 per ton. If the strawboard mill experiences rotting of the top tier to an absolute loss this represents a loss of about 20 tons or $320. Naturally, the top three tiers spoken of previously are not completely lost but are scarcely worth the efforts of removing them, trucking them into the mill, and absorbing chemicals vital to the cooking of good usable straw.

By the experiences stated above, it is thought that these top tiers can be protected from the high degree of decay for 1 year or more by the use of about 500 pounds of sodium pentachlorphenate. This would mean a net saving of from $200 to $600 per stack depending on whether 20 or 60 tons are lost due to rotting.

Conclusions

Between 5 and 15% of stacked straw is lost due to decay brought about by microorganisms which find a compatable environment in baled straw which is exposed to sunlight, heat and rainfall. Experimental data show that considerable savings will be made by the strawboard manufacturers by the use of pentachlorphenate. Amounts of about 1 pound per 7 square feet of surface area will apparently give an acceptable state of preservation.

Surfaces of stacks under consideration were treated both by spraying and by dusting with the former being found more satisfactory. When dusting the compound in its flake form it has been found impossible to stand on the windward side while treating and some compound is lost with the slightest breeze before natural precipitation wets it down into the straw. However, when application is performed in the liquid state it is also necessary to prevent fine mists forming because of the possibility of skin irritations. Contact with the skin causes some burning sensation which can normally be remedied by copious use of water and soap.

Theory of Statistics

The emphasis given mathematical statistics by its use in controlling product quality has led many engineers in th paper industry to desire a better understanding of the fundamental notions and assumptions underlying statistical theory. This book is particularly well adapted to these individuals who are generally forced to study without the aid of an instructor. It requires only a limited knowledge of mathematics as a prerequisite. The authors avoid rigorous proofs and yet the logical manner in which each topic is presented convinces the reader of its validity. The list of exercises at the end of each chapter is especially helpful to the self-taught student.

The book may conveniently be divided into five sections: chapters 1-5 deal with attribute theory; chapters 6-10, with frequency distributions; chapters 11-17, with correlation theory; chapters 18-23, with sampling theory; and chapter 24, with interpolation and graduations. The abstract symbolism in the first five chapters may dull the interest of many beginners. The reviewer recommends for this reason that the reading of chapters 2-5 be delayed until chapter 22 is read. The continuity of the discussion will not be disturbed. Chapter 14 could have been clarified somewhat had full use been made of determinant theory to simplify the rather involved expressions for regression planes and hyperplanes and multiple and partial correlation coefficients. The discussions on sampling theory should add much to the engineer's understanding of sampling problems. From the standpoint of the paper industry it is regrettable that these vivid discussions have not been extended to include a more complete exposition of analysis of variance.

A copy of this book should be available to every individual interested in statistical approaches to research and control problems. It may eliminate many of the dangers ever present in his application of the cook book type statistics.

An Introduction to the Theory of Statistics. By Yule, G. U. & Kendall, M. G. 13th Edition, Revised. 1945. Charles Griffin & Company, Limited, London, (570 pp. 6½ x 9) $8.00 (English price).

CARL E. NOBLE

TAPPI Notes

Myles W. Reif, general superintendent of the Blandin Paper Company, has succeeded R. A. Campbell as official corporate representative in the Technical Association.

William A. Kraske, formerly of the University of Wisconsin, is now with the Scott Paper Company, Chester, Pa.

Raymond T. De Pan, formerly of the Flintkote Company, is now development engineer for the Downingtown Mfg. Company, Downingtown, Pa.

Walter H. Swanson, formerly staff sulphite superintendent, is now chief of staff for the Kimberly-Clark Corporation, Neenah, Wis.

Industrial Experimentation

The Chemical Publishing Company has just issued "Industrial Experimentation" by K. A. Brownlee (151 pp. 6 x 9). This monograph was prepared by the directorate of the British Ordnance Factories (Explosives) for the use, primarily, of those concerned with pilot plant and plant scale experiments on chemical manufacturing processes.

Much work was being done and it became evident that it was desirable for the results of such experiments to be subjected to critical tests of significance. This book is intended to be a guide to both the planning and the interpretation of experiments on the industrial scale.

Included are such subjects as: fundamental statistical conceptions, the significance of means, the comparison of variances, the x-square test, the quality control chart, multiple correlation, etc.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y. at $3.75 per copy.